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# STRENGTHENING OF THE AGENCY'S MAIN ACTIVITIES

## Report by the Director General

1. Last year, in resolution GC(XXXVII)/RES/618, the General Conference affirmed that, in order to fulfil the objectives of the Agency, "an adequate balance should be achieved among the Agency's main activities, having particularly in mind safeguards and non-safeguards activities"; confirmed "the need to maintain and strengthen the effectiveness and efficiency of the Agency's technical assistance and co-operation activities in accordance with the Statute"; and requested the Director General "to present, in consultation with Member States, new initiatives to strengthen the main activities of the Agency ... particularly technical co-operation activities, through the development of effective programmes aimed at improving the scientific and technological capabilities of developing countries in the fields of peaceful applications of nuclear energy and achieving sustainable development" and "to take account of the view of the Conference on this question in the preparation of the programme and budget and of the draft Medium-Term Plan for 1995-2000". The Resolution also requested the Director General and the Board of Governors to remain seized of the matter and requested the Director General to report periodically to the Board of Governors and to the General Conference on the implementation of the resolution.

2. The provisions of this resolution and earlier resolutions of the General Conference on this question have continued to be an important guide to the Secretariat in its work. This report outlines measures taken since the last regular session of the General Conference to strengthen the Agency's main activities. It focuses on the management measures and policies which provide the framework for the development of more effective programmes. It also notes some specific matters in relation to the Medium Term Plan, the Programme and Budget for 1995-1996 and the technical co-operation programmes as well as other areas which are relevant to

the provisions of the resolution. It does not, however, attempt to identify the numerous achievements in various elements of the Agency's programme which have contributed to improving the impact of Agency activities. These are presented in the Agency's Annual Report and other documents prepared for the Policy Making Organs. Strengthening the effectiveness and improving the efficiency of safeguards is the subject of a separate report but a number of the measures discussed here are also relevant to the safeguards area.

**Management Measures**

3. Work has continued on a number of measures designed to enhance efficiency, to increase the effectiveness of Agency programmes and to increase the Agency's capability to respond in a timely way to the changing needs of Member States.

4. Measures have been introduced to enable the Agency to return to normal programme implementation in 1995. It will be recalled that since 1991 it has been necessary to make cuts to the Agency's expenditure and defer programmes as a result of non-receipt of some major contributions to the regular budget. However, after three years of deferrals, the financial situation has stabilized to the extent that total contributions, including the payment of arrears received during the year, have come to follow an established pattern such that the annual resources received nearly equal the annual budget requirements. As a result, it is now expected that in 1995 the Agency can return to full — or nearly full — implementation of the approved programme.

5. As has been requested by the Board of Governors, and as discussed in GOV/INF/751, the Agency is studying the implications of a move from an organization based to a programme based appropriation and accounting system. A change would contribute to greater transparency in the reporting of programme costs and facilitate decision making. It should also lead to a sharper focus on programme expenditures and implementation.

6. Progress has been made in introducing an Agency wide system of programme assessment — the Programme Performance Assessment System (PPAS). The PPAS will assist the Agency in making informed decisions regarding which new programmes should be initiated, determining what changes need to be made to ongoing programmes to increase their effectiveness and in ascertaining the extent to which completed programmes met their objectives.

7. In response to a request by the Board of Governors in June 1993 a discussion paper on programme evaluation, which sets out the framework of PPAS, was issued in September 1993 (GOV/INF/710). This paper remains the basis for a system which will to the extent possible build on existing evaluation procedures in the Agency and avoid additional bureaucratic overheads. The introduction of a programme based accounting system will facilitate the evaluation process by eliminating the current need to prepare special reports on programme and budget performance as a basis for assessment. The PPAS is being introduced progressively.

8. During the preparation of the Programme and Budget for 1995-1996, the statements of objectives for all projects were reviewed. This resulted in changes and improvements to many of the project objectives to show more clearly the desired results and benefits for Member States. The descriptions of project tasks were also modified to indicate the expected results — generally a measurable product or other type of output which would contribute to the achievement of the desired objective. In view of the importance of clearly stated objectives and measurable outputs, emphasis will continue to be given to improvement in this area during future programme and budget development and review exercises.

9. Key projects were selected in the past year for mid-year management performance reviews to ensure that the approved 1994 programme of work was proceeding as planned or that any required changes were being considered or had been introduced. The reviews focused attention on the performance of the selected projects compared to the work planned for 1994 and the resources spent. Timely corrective action resulting from the review should result in improved programme delivery. This performance review of selected projects is expected to be a continuing requirement for the sound management of programmes.

10. To enhance staff skills in conducting performance reviews and to re-enforce management goals, training in the principles of PPAS and basic project management is being provided to approximately one hundred key Agency staff such as project managers, section heads and senior managers. Wherever possible, the lectures and training materials are based on specific Agency projects and work activities. It is intended to provide additional training in other aspects of project and programme management and assessment as part of the Agency's normal training programme.

11. In the future, other components of PPAS, such as the use of performance indicators and the evaluation of completed Agency work, will be used to support proposals for the strengthening of main activities. Once PPAS is fully incorporated into the Agency's decision

making process it will result in an appropriate appraisal of all proposed work, review of important ongoing work and evaluation of major completed work. The system will therefore be integrated with, and contribute to, the programme planning and budget process for identifying the highest priority activities and effective means of delivery to meet Member State needs.

**Medium Term Plan for 1995-2000**

12. As foreshadowed in GOV/2683-GC(XXXVII)/1074 the Secretariat has prepared a Medium Term Plan for 1995-2000 (copy attached). Prior to the preparation of the plan programme managers discussed the problems facing the nuclear community and the Agency in the medium term and of the proposed Agency response to them. Elements of the plan were reviewed by a number of advisory groups and by especially commissioned outside experts. Account was taken of comments received during the discussions last year in the Policy Making Organs on the strengthening of the Agency's main activities. Member States were invited to provide written comments. The seventeen sets of written comments received were circulated as background to consideration of the Plan by the Board of Governors. Following initial consideration by the Administrative and Budgetary Committee, the Board of Governors considered the Plan at its meetings in June. In the Secretariat's view the Plan, together with written comments received and the additional comments made during discussion in the Board, provide a useful body of material for developing proposals for further strengthening priority areas of the Agency's activity.

13. In concluding its discussion on the Medium Term Plan for 1995-2000, the Board of Governors noted that as the Plan was an internal document of the Secretariat it required no particular action by the Board. It also requested the Secretariat to take account of the comments made by Members, either in writing or orally during the debate, both in the internal use of the plan and in subsequent editions of the plan.

**Programme and Budget for 1995-1996**

14. The preparation of draft proposals for the Programme and Budget for 1995-1996 contained in document GC(XXXVIII)/5 was guided by the request of the General Conference to take account of the views of Member States on the question of strengthening of the Agency's main activities. The budget proposals for 1995 reflect for the eleventh consecutive year the constraint of "zero real growth". In spite of that restriction, efforts were made to strengthen the

Agency's main activities, inter alia, by identifying savings which could be deployed to high priority programme activities. As a result, proposals have been made to increase funding to a number of areas. The radioactive waste management programme would be strengthened with a view particularly to the preparation of "technology packages" which would address the different needs of Member States — from waste management planning and infrastructure to handling, treatment and storage of radioactive wastes and to decommissioning of nuclear installations. In the area of human health, additional resources are proposed to strengthen the Agency's work on radiation therapy for cancer, including particularly the introduction of suitable radiotherapy techniques to improve cancer cure in developing countries. Further, a new project has been proposed on radiation processing of sewage sludge and its use to increase crop yields and protect the environment. This project would involve both the Industrial Applications and Soil Fertility and Irrigation and Crop Production sub-programmes and would be an additional Agency contribution to implementation of UNCED's Agenda 21, being directly related to Chapter 21 of that document. Another measure proposed is the strengthening of the Department of Technical Co-operation by creating a section for Eastern Europe and providing additional support for the development of model projects.

15. Redeployment of resources is also proposed in the Programme and Budget for 1996. In view of the strong Member States' support for strengthening priority areas, as indicated in the discussions in the Board on both the Medium Term Plan for 1995-2000 and the Programme and Budget for 1995, it is intended to review the 1996 programme and budget proposals in the coming months with a view to proposing a further shift of resources to higher priority activities.

**Strengthening the Effectiveness and Efficiency of the Agency's Technical Assistance and Co-operation Activities**

16. The report by the Director General on the Agency's Technical Co-operation Activities in 1993 is contained in document GC(XXXVIII)/INF/3. As indicated in that report, all categories of technical assistance funds increased in 1993 and contributions to the Technical Assistance and Co-operation Fund (TACF) reached 79.3% of the target — the highest percentage since 1989. Programme delivery kept pace with this increase and resulted in implementation levels among the highest registered in the past decade. In 1994, however, the indications for the volume of resources available to the Technical Co-operation programme are not positive - particularly in regard to the proportion of funds pledged compared to the target levels approved by the Conference for the TACF.

17. The report to the last General Conference on Strengthening the Agency's main activities noted steps to initiate a 'model project' approach to technical co-operation activities. This approach has been further developed with a view to further improving the effectiveness and efficiency of the programme.

18. The criteria for model projects have been identified as:

- responsiveness to a real need of the country;
- significant economic or social impact for the end user;
- nuclear technology plays an indispensable role and is competitive or has distinct advantages over others;
- government commitment and infrastructure conducive to sustainable success.

19. Strong support was expressed in the Board for the model project approach which was seen as setting the long-term direction of the Agency's technical co-operation programme as a whole, and as a basis for securing continuing improvements. Twelve model projects were approved by the Board of Governors in December 1993 and are now being implemented. The projects cover fruit fly and tsetse fly eradication; the production of technetium generators for nuclear medicine; industrial scale food irradiation; radiotherapy and nuclear medicine networks; training for operational safety at nuclear power plants; industrial scale demonstration of the use of electron beam purification of flue gases from fossil fueled power plants; strengthening of nuclear safety, radiation protection and waste management infrastructures; radiation sterilization of human tissue for transplantation; and screening of newborns for neonatal hypothyroidism.

20. Importantly, the interest shown in the model project concept has been clearly reflected in the requests for assistance which have since been received and which form the basis for the 1995-1996 technical co-operation programme. Those requests will also be the basis for the second group of model projects which is currently being prepared.

21. The main purpose of model projects is to increase the impact of technical co-operation activity on the achievement of national development goals. To succeed in this major initiative to strengthen the impact of the Agency's main activities the Secretariat will need the full co-operation of recipients and donors. The concept therefore poses challenges to the three parties involved.

22. The model project concept is a challenge to the Secretariat. Model projects are often larger and more complex, with more parties involved thus requiring more effort for successful

execution. They require thorough preparation involving close contact with national counterparts and potential external funding sources in planning work and also with other organizations which might be involved such as FAO, WHO and UNDP, to provide for the necessary collaboration in the field. There is also a challenge to the technical and scientific Divisions of the Agency. They will be called upon to contribute more to project formulation design and review and to defining both the importance and limitations of the nuclear techniques involved.

23. For recipients, model projects can lead to new roles for the peaceful uses of nuclear energy. For example in some cases the projects will enable nuclear research institutes to contribute more directly to national development goals with measurable results in terms of such factors as increased agricultural productivity, improved quality of industrial products or better health services. Such direct involvement in national development efforts can help secure the national role of, and increase public support for, nuclear research institutes. In other cases, model projects will result in Agency collaboration being extended to new national institutions, not traditionally associated with nuclear technologies, which will provide the channel for bringing the benefits of nuclear technologies directly to end users such as farmers, physicians or industry. More generally, model projects will require a major commitment of resources on the part of national authorities. To achieve an adequate level of commitment the projects will need to be accepted as contributing to major national development goals. In some cases this will involve a significant change in attitudes to the role of nuclear technology in national development.

24. There is also a challenge to the various potential donors. The model project concept has been well received by donor countries as promising more effective use of funds. However, realization of the full potential of model projects will need additional funding from Member States. More attention need be given to the possibility of using national sources of funds beyond those normally available for Agency projects — such as those earmarked for wider sectors where nuclear technology is being applied (e.g. agriculture and public health) and where there could be collaboration between the Agency's programmes and the bilateral programmes of the donor country. The Agency is also continuing to work to identify new multilateral sources of funding and would welcome Member State support in this effort. In this context it may be noted that recent efforts to secure funding through the World Bank, UNDP and UNEP managed Global Environment Facility (GEF) for activities related to the Agenda 21 of the United Nations Conference on Environment and Development have so far proved unsuccessful. However, efforts will be continued however in this area and other possible avenues such as regional development institutions will be explored.

25. While the development of model projects is aimed at increasing the impact of the Agency's technical co-operation programme, it is not meant to exclude assistance for the creation or strengthening of infrastructures. Such projects will continue to be supported. Also, training will remain an important component of the programme. Nevertheless, if the potential end-users — such as power plant operators and regulators, farmers and doctors - are kept in mind, the technology transferred will become more relevant and therefore put to better use.

26. The 1994 Technical Co-operation Policy Review Seminar, is a further measure of great relevance for strengthening the effectiveness and improving the efficiency of the Agency's Technical Assistance and Co-operation activities. Indeed, the Seminar offers an excellent opportunity to discuss policies with all Member States to ensure that the Technical Co-operation programme remains responsive to the changing needs of developing countries and to the global development agenda. One issue to be discussed at the Seminar warrants particular mention. There is a trend in the United Nations system, notably in UNDP, to seek increased assurance that technical assistance activities are in line with national development priorities. This is being done in the Agency through country programme reviews and pre-project missions. In addition, the Policy Review Seminar will examine a proposal to base programmes for individual countries on national medium term plans for the application of nuclear technology in support of national development. The formulation of such plans would be a national responsibility but the Agency could assist in this work. Such an approach would need to be flexible so as to remain in step with changing national requirements and priorities.

**Specific Programme Areas**

27. In addition to the measures outlined above, and at the initiative of Member States, the Policy Making Organs have drawn attention in recent years to specific elements of the technology transfer programme. The agenda for the 1994 regular session of the General Conference contains two separate items dealing with such issues — the practical utilization of food irradiation in developing countries and plans for producing potable water economically. These issues are the subject of separate reports.

28. In order to enhance understanding of some areas of the Agency's work and to facilitate Member State comments thereon, the Secretariat initiated briefings for Member States on particular issues including the DECADES programme (on the comparative study of the health and environmental impacts of different means of generating electricity); the work of the Agency's Marine Environment Laboratory, Monaco; and the model projects developed under

the technical co-operation programme as mentioned above. In addition, briefing visits have been arranged to the Agency's laboratories at Seibersdorf and Monaco.

29. In March 1994 a request was received by the Secretariat for the inclusion of an item entitled "Utilizing isotope hydrology for groundwater management" on the agenda for the June meeting of the Board of Governors. The explanatory memorandum (contained in document GOV/2723) noted inter alia that "to further the Agency's objectives of promoting the peaceful uses of nuclear energy, two specific initiatives had been suggested with the wide support of Board members. While there has been some progress in the field of food irradiation, more needs to be done in the area of isotope hydrology." To this end, the memorandum noted "it is now necessary to take concrete, time-bound and result oriented action to translate this proposal into action on the ground" and made specific proposals in this regard.

30. Against this background the Secretariat prepared a paper for consideration by the Board of Governors. That paper (GOV/INF/738) outlined the Agency's record over the years in the field of isotope hydrology and its more recent activities and plans in the area of groundwater control. More specifically, the paper noted that joint effort of the Department of Technical Co-operation and the Department of Research and Isotopes had been started in April 1993 to streamline the Agency's activities in developing countries pertaining to the use of isotope techniques in the water sector. As a first step and in recognition of the specific relevance of water resources development for Africa, a Regional Planning Seminar on Water Resources Assessment in Arid and Semi-arid Regions of Africa had been held in September 1993 in Rabat, Morocco. The major aim of the seminar was to define a regional project on the practical use of isotope techniques in the development of water resources in arid and semi-arid countries of Africa. During the seminar, the outline of a proposed regional project entitled "Practical use of isotope techniques in water resources development" had been prepared, and the focal points of the national contributions defined. Every effort was made to meet the model project criteria, so as to plan practical end user oriented activities pertaining to the water sector within the African region. The objective of this regional project was to apply isotope techniques in combination with other hydrological investigations to practical problems with respect to the further development and management of their water resources. In particular, the project was aimed at solving problems where the use of isotope techniques is indispensable. The problems included

- identification and evaluation of groundwater recharge and discharge — two quantities which are crucial for rational water resources development and management in these countries;

- evaluation of surface water infiltration to groundwater — a practical task in connection with the development of surface water resources for drinking water supply;
- identification of palaeowater, often the only potable water resource in arid and semi-arid regions;
- definition of aquifer vulnerability to pollution and over exploitation.

The preliminary budget was estimated to be about $3 million for a project duration of four years.

31. At its meetings in June the Board of Governors took note of the secretariat report and supported the development of a project proposal to be submitted to the TACC in November. To this end missions are being undertaken to the individual countries to finalize a project document in time to be available for discussions with Member States during the regular session of the General Conference.

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# MEDIUM TERM PLAN 1995-2000

## NOTE BY THE SECRETARIAT

Attached is a draft Medium Term Plan (MTP) for the period 1995-2000.

In the preparation of the MTP, the Agency took into account comments received during discussions at the September meetings of the Board of Governors and the Committee of the Whole of the General Conference on ways to strengthen the Agency's main activities.

In response to those comments, several significant changes were made to the MTP. In order to facilitate comparison, the plan has been structured to present information in the same "Major Programme" categories as used in the Programme and Budget document. It attempts to identify changes in activity as well as indicating ongoing efforts. It has to be borne in mind that many of the Agency's activities and projects are of a continuing nature and represent a kind of basic level of effort.

The draft MTP is now being circulated for comments and the Secretariat would welcome the receipt of such comments before 31 January 1994. The Secretariat would also be available for discussions on the MTP with individual Member States or groups of Member States.

21 December 1993

# DRAFT MEDIUM TERM PLAN FOR 1995–2000

## I. BACKGROUND

Since 1985, the Agency's programme perspective has been biennial, with only occasional indications being given of longer term aims. Within that framework the annual budget and programme reviews permit modifications in the light of changing circumstances. Members of the Board of Governors have expressed a desire for a medium term plan which would provide a framework for discussions on the direction of the Agency's future activities and, more importantly, planned changes in activities. A draft Medium Term Plan for 1993–1998 was contained in a Note by the Secretariat of 25 October 1991. That draft was considered by the Board but not submitted formally for its approval. It was conveyed to the General Conference in 1992 for information.

The preparation of the present draft Medium Term Plan was preceded by discussions amongst programme managers of the problems and challenges facing the nuclear community and the Agency in the medium term and of the proposed Agency responses to them. Elements of the plan were reviewed by a number of Agency advisory groups and by specially commissioned outside experts.

Some events in the past which have resulted in significant changes in the Agency's work could not have been foreseen — the accident at Chernobyl, the upsurge in concern about energy sources that lead to unacceptable carbon dioxide emissions, the advent of a new political situation in central and eastern Europe, or the role assigned to the Agency by the United Nations Security Council in connection with the situation in Iraq. In today's political world, the discussion of the important nuclear disarmament and control initiatives recently advanced by Member States already involves a call for Agency participation. If realized, this may entail major new verification roles. These developments may also in turn have an impact on the ongoing safeguards activities of the Agency.

All such changes require flexibility in organization and planning, allowing timely response by Member States and the Secretariat. A contingency fund, perhaps in the form of an enlarged and modified Working Capital Fund, could form a part of the Agency's ability to meet unforeseen challenges.

Given the uncertainty of future events, no medium term plan can be an accurate forecast of activities. Rather it is a guide for action in relation to developments that are foreseen to have some degree of probability. It does not provide cost estimates. Its purpose is to identify trends, ambitions and strategic goals in order to provide guidance for drawing up biennial programmes and the related budgets.

## II. STRUCTURE OF THE MEDIUM TERM PLAN

The objectives of the Agency under the Statute are to "accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world" and to verify that nuclear material and facilities under its safeguards are not used to "further any military purpose." In order to pursue these objectives, the Agency is authorized to carry out certain functions. To organize its work, the Agency has adopted a programme and budget structure which currently consists of the following five major programme areas:

- Nuclear Power and the Fuel Cycle;
- Nuclear Applications;
- Nuclear Safety and Radiation Protection;
- Safeguards;
- Direction and Support.

In this draft Medium Term Plan the discussion follows the major programme structure so as to strengthen the link with the biennial programme cycle. Emphasis is given to significant changes in programme directions. In view of the interdisciplinary nature of technology transfer, this part of the Agency's activities is examined separately. Certain mechanisms involved in the Agency's work are considered in the Annex.

## III. GENERAL FRAMEWORK FOR AGENCY ACTIVITIES TO THE YEAR 2000

### Current situation

The Agency's programme and budget is currently characterized by: retention of "zero real growth" in regular budget levels; freezing of the relative proportions of regular budget resources allocated to safeguards and non-safeguards activities; expanding levels of resources for the Technical Assistance and Co-operation Fund; and significant and growing levels of extrabudgetary and "in kind" support for various Agency activities, including in particular safeguards and safety.

While there continue to be shifts in emphasis within and between programmes and subprogrammes, only minimal redirection of resources has occurred in recent years. This has been due to the general acceptance amongst Member States that the ratio of budgetary resources allocated to safeguards and non-safeguards activities should be maintained, and the view that within programme areas the existing balance between the various interests and priorities of Member States is reasonable. Also, once established, many programmes tend to become of continuing usefulness to, and acquire special support within, particular branches of national nuclear administrations and this naturally tends to preserve programme patterns and hinder the redirection of resources. As against this tendency there is a general wish amongst Member States to see the Agency respond more effectively within the regular budget to emerging priorities. They would like to see this being accomplished within zero real growth through the phasing out of programme areas which may no longer warrant high priority attention. It has, however, proved difficult to achieve a broad based agreement on the identification of such areas.

Despite zero real growth in the budget since 1985 (and negative real growth in the last three years), the Agency's activities have increased substantially and new high priority programmes have in fact been introduced. In part, growth in activity has been possible because increased efficiency has released some resources within the budget. In part, however, growth has been possible because Member States have made available increasing resources outside the regular budget, for example in the form of cost free experts (especially in the Departments of Safeguards and Nuclear Energy and Safety), through national safeguards support programmes, and in the form of voluntary contributions. Although the various conditions attached to some of these resources may limit their usefulness, they have helped to bring about activities that would otherwise not have been possible. It should also be noted that substantial nuclear safety advisory services have been added for a relatively low extra burden on the budget because the Member States using the services have been asked to pay much of the costs involved. However, extrabudgetary contributions are not an adequate substitute for resources included within the regular budget and overall there remains a conflict between the growing demand for action by the Agency and stagnant regular resources.

Within the safeguards area a fairly significant redirection of resources has been achieved over recent years, permitting the introduction of new activities, and discussions are continuing in regard to redirections which would possibly result in savings that could be applied to new activities. It is evident, however, that major new activities resulting from further arms control and disarmament agreements will require substantial additional resources if the Agency is to undertake a verification role.

Initiatives have recently been taken to strengthen the evaluation of the Agency's programmes with a view to improving implementation and providing a better basis for future programme proposals.

## Outlook 1995–2000

In 1995, the Review and Extension Conference on the Treaty on the Non-Proliferation of Nuclear Weapons will mark a crucial moment in nuclear non-proliferation. Agency safeguards are expected to receive increasing attention as more non-nuclear-weapon States adopt comprehensive safeguards and progress is made towards the establishment of nuclear-weapon-free zones.

As a result of the ending of the Cold War, there is a growing opportunity for arms control and disarmament measures in the nuclear field. Developments within the non-proliferation regime and related nuclear control mechanisms will place increased responsibilities on the Agency.

As evidenced by the United Nations Conference on Environment and Development (UNCED), environmental protection and sustainable development have become hallmarks of national and international development strategies. The Agency's programmes will be increasingly directed towards the development and technology transfer objectives outlined in Agenda 21 from that Conference.

A world population that is growing and that seeks to raise its standard of living will need more energy, and particularly electricity, in the period ahead. A more efficient use of energy may somewhat offset, but will by no means neutralize, the increase in demand, which

will be particularly strong in developing countries. A potentially important factor is that the use of fossil fuels at current levels is viewed as environmentally problematic and that nuclear power could increasingly come to be seen as presenting fewer environmental problems, both local and global.

In the field of nuclear power there may be broad support for medium term efforts addressing issues of safety, waste management and the assessment of the comparative environmental impacts of different means of generating energy. These assessments are likely to underpin judgements later in the period about the choice of energy mixes in the 21st century.

The increasing world population, with a major part living in developing areas, will need greatly increased supplies of food and fresh water, better health care and greater access to industrial goods. Nuclear methods that can lead to improvements in the production and preservation of food, in health care, in industrial production and in the provision of water supplies are increasing in number. They are often competitive with other methods – and indeed in some cases they are the only methods available. The scope for the exchange of experience in using nuclear methods and for transferring these methods to developing countries is therefore expanding. Non-power applications of nuclear energy will remain the area of technology transfer of greatest interest for a large number of Member States.

In view of new demands being placed on the Agency, there will need to be growth in the resources available to it. In these circumstances either the "zero real growth" policy will cease to have practical significance for defining the scope of the Agency's activities because of the volume of extrabudgetary resources available or the policy will need to be understood to apply only to a set of pre-existing programmes, with new activities accounted for separately. New funding mechanisms are likely to be required to ensure predictability and equitable sharing of costs for new responsibilities. Pending such developments, increased reliance is likely to be placed on extrabudgetary resources, entailing both operational uncertainties and possible undesirable restraints on their use.

At the same time it will be necessary to continue efforts to implement further efficiency gains and to identify areas of activity where changed circumstances and priorities enable programmes to be reduced or phased out. The Medium Term Plan seeks to contribute to these objectives. The enhanced programme evaluation effort will also provide an improved basis for judgements on these issues. Ultimately, however, decisions in this regard rest with Member States.

## IV. TRANSFER OF NUCLEAR TECHNOLOGY

The vital activity of technology transfer is carried out through the technical co-operation programme and with support and direct contributions from the technical and scientific areas of the Agency.

The technical co-operation efforts of the past decades — emphasizing the strengthening of the infrastructure and capacity for nuclear technology in recipient countries — have helped in many Member States to bring about a situation where the basic

infrastructure is now in place. Scientific manpower has been built up, technologies have been made available and some research programmes are being planned and conducted by local experts. These accomplishments have helped some Member States to apply nuclear energy techniques in a wide range of applications, including nuclear power generation and associated fuel cycle activities. In other States, technical co-operation has paved the way for a shift from the underpinning of basic infrastructures to the dissemination of the knowledge that has been gained, the application of the technologies that have been mastered, and the provision to end-user communities of the benefits that nuclear technology can bring. In a number of countries a need remains for support for the establishment of adequate safety and radiation protection infrastructures. The Agency must continue to provide assistance in these cases since proper infrastructures are a prerequisite for the transfer and safe exploitation of all nuclear technologies.

The value of the technical co-operation programme should be judged not only by its success in transferring nuclear technology but also, and more importantly, by the way it satisfies actual needs and by the lasting impact that projects can bring. In this connection, the "model project" approach has been initiated in order, firstly, to identify and develop projects that would stimulate a gradual reorientation of the technical co-operation programme towards the end-user with a more direct impact on the sectorial and national development plans of the recipient countries. Secondly, the approach should also help to improve the quality of the technical co-operation programme as a whole through the introduction of better designed and more professionally managed projects.

The following features have been selected as a basis for identifying suitable model projects:

- The project should be in response to a real need of the country.
- There should be a significant economic or social impact for the end-user.
- Nuclear technology should play an indispensable role in the project and should be competitive with or have distinct advantages over other available technologies.
- Local conditions should be conducive to sustainable success of the project, with future reliance on national support.

Over the period of the Medium Term Plan, the model project approach will expand to cover much of the technical co-operation programme. Member States will be assisted in identifying sectors where nuclear technology could play a major role and in planning for its expanded use. The question of impact will become the focus of advice to governments.

National nuclear programmes are increasingly being reoriented from fostering pure science and building up infrastructures to serving the end-user. As a result, some of the Agency's traditional counterparts (often atomic energy authorities) will strengthen their links with potential new users or beneficiaries of nuclear techniques — sectorial ministries, hospitals, industry or institutions. This move would also require that assistance from the Agency be redirected from customary counterparts towards those sectors which promise the maximum impact.

Enhancement of the efficiency and effectiveness of technical co-operation activities will continue to be a focus over the next five years. The model project approach will complement a number of other measures which are being introduced. These include:

- The use of country and pre-project missions to help in better project identification and design.
- The use of redesigned project request forms to facilitate linkage of projects with national plans or regional needs, ensure sustainability and emphasize nuclear safety and radiation protection.
- Reduction in the number of projects per country, with concentration on those of greatest social, economic or environmental impact.
- Streamlining of the project appraisal and project implementation process.
- Introduction of systematic means of project review and follow-up.
- Creation of a capability for rendering support to completed projects.

Despite zero growth in the Agency's budget since 1985, the technical co-operation activities have increased substantially as a result of increasing extrabudgetary resources and voluntary contributions made available by Member States, in addition to increases in efficiency and the streamlining of work. The Agency's role in accelerating and enlarging the contribution of atomic energy can be expected to continue to expand throughout the period of the Medium Term Plan.

Major parts of the Agency in addition to the Department of Technical Co-operation are already engaged in technology transfer either directly or in support of the technical co-operation programme. There are areas where this activity can be expected to increase. For example, as safety standards are becoming accepted, efforts are being redirected towards support for their implementation, and as nuclear techniques are becoming established efforts are being redirected to their transfer. In these ways increasing complementarity can be expected between the activities of the technical programmes and the technical co-operation programme. At the same time, the features found in model projects will be taken over increasingly to characterize the work in the technical programme areas.

To avoid duplication of work and maximize the contribution of nuclear techniques, the Agency will take increasing advantage of the complementary expertise and activities of intergovernmental, non-governmental, regional and national bodies. It will seek to make greater use of such resources, to exploit opportunities for collaborative efforts and where possible to devolve activities to agencies which have a more direct engagement with end-users and beneficiaries. In such circumstances, however, the Agency will retain the lead role in relation to quality control and all aspects pertaining to nuclear and radiation safety.

## V. MAJOR PROGRAMME 1: NUCLEAR POWER AND THE FUEL CYCLE

### Current situation

In most Member States (with the exception of those in East Asia) nuclear power programmes are no longer expanding and much of the nuclear power plant industry is going through a period of reorientation to services. Nevertheless, some industrial concerns are

preparing for a revitalization of the nuclear option and are developing new designs — mainly evolutionary — based on the extensive experience available with current types.

The present aims of the Agency programme in this area include support to developing Member States which have introduced, or are considering the introduction of, a nuclear power programme. This support involves assistance in developing national expertise and providing information to authorities and plant operators, aimed at bringing current power plant operation to the high level of safety and reliability reached in the best performing plants. The programme also supports the development of fuel with higher performance and improved economics, and improved reactor designs.

An important current programme is the development of a methodology for the comparative assessment of nuclear power and other energy sources in terms of their economic, health and environmental impacts. This methodology is being pursued through a joint project with the participation of eight international agencies. This project will provide an approach which allows the integration of the environmental and health impacts of different options into the process of planning for the expansion of electricity generation.

In the nuclear fuel cycle area, the current programme is geared to help in further improving the reliability, economic viability and safety of fuel cycle activities and in minimizing their environmental and health impacts. Special emphasis is given to spent fuel management, plutonium issues, the performance and safety of water reactor fuels and the integration into a worldwide database of information on uranium resources in Member States with emerging market economies.

The current programme in the area of waste management covers the full range of radioactive wastes arising from the nuclear fuel cycle and nuclear application activities. Major projects include the development of an international consensus on fundamentals, principles and criteria to form the basis of standards for the safe management and disposal of radioactive waste (RADWASS). Another major activity is the provision of practical guidance and assistance in establishing and strengthening infrastructures for waste management in developing countries. There is growing involvement in international initiatives connected with environmental monitoring, including those related to past radioactive waste dumping at sea.

## Outlook 1995–2000

It is estimated that between the years 2000 and 2010 some 1000–1500 GW(e) of new electricity generating capacity will be needed worldwide to meet increasing demands and replace obsolete plants. This corresponds to more than a thousand plants of the current largest size. Environmental concerns, especially the risk of local and regional pollution and global climate change, are likely to become increasingly important factors in the decisions which will soon have to be taken on the types of plant to be ordered. If nuclear power is to have a significant share in the expansion, there will have to be confidence in its safety, economic competitiveness and environmental advantages.

Since there is no organization within the United Nations system covering the whole range of energy issues, the Agency might play an important role in catalysing and co-ordinating actions undertaken by different international and other specialized organizations in their respective areas of expertise.

The emphasis in the medium term should be on issues likely to be vital to decisions on the role of nuclear power in national energy plans, in particular:

- the comparative assessment of the economic, health and environmental aspects of energy systems and the introduction of the results into the formulation of energy policy and electricity system planning;
- assurances of the continued safe and reliable operation of current plants and further improvements in the design safety of new plants;
- the safety of waste management and waste disposal;
- assurances of the availability of nuclear technology, equipment, materials and services on the international market;
- the availability of trained and qualified personnel;
- the development of advanced nuclear power technologies.

In the later part of the period the focus of the Agency programme could shift towards facilitating the extended adoption of nuclear power if acceptance of this option becomes widespread.

After 1995, it is expected that a comprehensive framework for the comparative assessment of electricity supply strategies will have been established and disseminated to Member States and other international organizations for use in electricity system planning and decision support. Workshops, seminars and training courses for trainers and managers will be organized to publicize the outcome of the work and facilitate its use by Member States.

If there is a revival of the nuclear option in some countries and a new development of this option in others, especially developing countries, education and training of qualified manpower would be required. The Agency would provide training courses and, in particular, guidance on the establishment of national training programmes and training centres aiming at the highest levels of qualification.

There will be a continuation of information exchange on the development of advanced nuclear power technologies which could be able to meet the reliability and economics requirements and the still more stringent safety criteria in the next century.

Another aspect of the Agency's programme will be to monitor the availability of uranium and of fuel cycle services to provide updated analyses of the overall demand/supply situation. During the period of the Medium Term Plan there will be a reduction in activities relating to uranium exploration and ore processing (except in situ leaching) as technology in these areas is already available to interested Member States through the Agency's publications and assistance services.

The volume of spent fuel is increasing and the storage of this fuel will become a more important issue whatever management option is chosen. The Agency should provide for an expanded exchange of experience, information and advice on technical solutions and safety in this area.

Plutonium is produced by nuclear power plants and part of it will be separated in reprocessing plants. Additional large quantities of pure plutonium are likely to become available from dismantled warheads. Plutonium is potentially a valuable energy source but also a matter of concern amongst Member States because of its toxicity and potential weapons

use. There is increasing interest in additional international measures to address issues raised by the production, transport, storage and use of separated plutonium. Accordingly, in addition to its safeguards responsibility, the Agency will:

- maintain databases on plutonium that is produced and separated, and forecast stockpiles;
- take part in the elaboration and, if desired, the implementation of new international arrangements concerning plutonium and highly enriched uranium;
- promote an exchange of information on the use of plutonium in mixed oxide fuel (MOX) with regard to technical, economic, safety and non-proliferation issues and on plutonium burning to reduce stocks.

In the area of radioactive waste management the view of experts is that techniques are available to handle and dispose of radioactive waste in a safe manner and that evidence to support this conclusion already exists. The focus of attention in the medium term will be on developing international RADWASS standards which can be adopted by Member States and which will help to demonstrate that there exist internationally accepted approaches for managing and disposing of wastes in a safe manner. It is planned to complete the RADWASS standards by the year 2001. Pursuant to a resolution of the General Conference in 1993, preparatory work on an international convention on the safety of waste management will be started.

In the period covered by the Medium Term Plan, an increasing number of nuclear facilities will reach the end of their useful lives. Emphasis should be given to establishing criteria for decommissioning and to the exchange of information on this subject. Environmental remediation should also be an area of concern.

The Agency will probably become a focal point for international assessments of the environmental and radiological impact of waste disposal, including sea dumping of radioactive wastes. This activity will build on the work of the International Arctic Seas Assessment Project. In this connection, the laboratories in Monaco and Seibersdorf will play an indispensable role.

Many developing countries lack satisfactory infrastructure and waste management facilities for the increasing quantities of radioactive waste arising from isotope applications in hospitals and industry and from the operation of nuclear research centres. The accumulation of spent sources will require continued attention. A major aim for the Agency will be to help improve procedures for the safe disposal of radiation sources used in medicine and industry. The advisory services are expected to shift towards providing assistance with solving specific waste disposal problems in developing countries. Through its technical co-operation programme, the Agency will help to create national or possibly regional facilities for the disposal of waste from nuclear applications.

Plasma physics and controlled nuclear fusion research will be a significant field of international endeavour during the medium term and the Agency will continue to provide auspices for the International Thermonuclear Experimental Reactor Engineering Design Activities and promote collaboration between industrialized and developing countries in the area of plasma science, including its non-power applications. It will also support work related to the promotion of a high level of safety in fusion reactor design.

## VI. MAJOR PROGRAMME 2: NUCLEAR APPLICATIONS

### Current situation

The activities currently performed under this major programme are concerned with the contribution of nuclear applications to three areas: environmentally sustainable expansion of food and water supplies, improvements in health services, and advances in science and industrial techniques. In addition, nuclear methods are proving invaluable in environmental monitoring work.

The Agency's activities in the area of food and agriculture constitute a comprehensive programme to promote the use of nuclear techniques for increasing food production in developing Member States, including the development of new and better crop varieties, increased efficiency in the use of fertilizers and water, improvement of soil fertility, strengthened campaigns against animal diseases, improvements in livestock production and monitoring of pesticides and their residues. The sterile insect technique is being increasingly used to control or eradicate major insect pests. Irradiation of foods on a commercial scale has been introduced in a number of countries in order to guard against food poisoning, reduce food losses, increase storage life and overcome non-tariff barriers to trade. The Agency's Laboratories at Seibersdorf play a crucial role in these activities: in development work, quality control, the preparation of analytical and diagnostic kits and the production of radiation sterilized insects for use in the field.

Isotope techniques are of vital importance in hydrological investigations. Scientists trained in the overall spectrum of isotope hydrology methodologies are now available in many developing Member States but there is still a strong dependence on services from the Agency's hydrology laboratory. Technical co-operation projects have provided results of immediate use to recipient countries for making decisions on the development and management of water resources.

Activities in regard to human health have helped to establish nuclear medicine and radiotherapy centres in developing countries but in general their services are available to only a small fraction of the population. Although work on improving quality control of nuclear medicine instruments and radiotherapy dosimetry has been implemented, there remains a need to apply quality assurance to entire clinical processes, including the formal training of technicians and the certification of specialists in nuclear medicine and radiotherapy. Activities in nuclear medicine have been focused on clinical diagnosis although therapeutic applications could also be of significance in developing countries. In relation to radiotherapy, attention is being given to the fact that cancer diagnosis in developing countries is often made at very late stages, when the procedure is not curative but only palliative.

The IAEA/WHO Network of Secondary Standard Dosimetry Laboratories (SSDLs) continues to provide calibration and intercomparison services according to the needs of Member States.

Activities in human nutrition research have concentrated primarily on documenting food and nutrient consumption habits, with no immediate impact on the problem of

malnutrition, but co-ordinated research programmes have shown that nuclear techniques are especially suited for the study of this problem.

Nuclear techniques are well established in industry. Agency co-operation projects are showing the importance which nuclear non-destructive techniques and nucleonic control systems can have in improving quality in industrial production in developing countries. Work on the Joint UNDP/RCA/IAEA Project on the "Use of Isotopes and Radiation to Strengthen Technology and Support Environmentally Sustainable Development" is currently being expanded. Radiation processing technology has been introduced in many Member States for sterilization of medical products and food preservation and for processes in the cable and wire industry.

A co-ordinated worldwide network of nuclear and atomic data centres, of which the Agency forms a part, ensures that measured and evaluated data are available to all Member States. As a result of Agency assistance to many developing countries, the situation in regard to the availability, maintenance and operation of nuclear instruments has improved considerably but this area needs continued attention. A nuclear instrument spare parts service is provided by the Agency, particularly for Latin America and Africa. The research reactor database (RRDB) is maintained to provide Member States with information on the operation and use of all research reactors. National capabilities for the production of modern radiopharmaceuticals for diagnosis in cardiology, neurology and oncology now exist in several developing countries.

Nuclear techniques used in studies of pollutant pathways and interactions of pollutants in the environment are now being applied in a programme for reducing industry related environmental pollution. The Marine Environment Laboratory in Monaco is using nuclear and isotopic techniques to study marine processes and marine pollution. It acts as an international centre for analytical quality assurance and training.

## Outlook 1995–2000

The FAO estimates that, in order to meet the needs of the growing world population, it will be necessary to double the global food production over the next thirty years in an environmentally sustainable manner. This probably can be done, primarily by increasing agricultural productivity in the developing world, but, as lead times for the introduction of new crops or new techniques are often long, early decisions will be needed on which paths to take. Agenda 21 points to rapidly increasing demands for fresh water and to a scarcity in water supplies which is already limiting development in many regions. There is a continuing struggle to improve health services in the developing world and there will be an increasing demand for faster industrial development, improved and environmentally sustainable industrial techniques and environmental monitoring and protection.

In each of these areas nuclear applications can play an important role. The relative priority between, for example, the applications of nuclear techniques in agriculture and in medicine cannot be determined in any simple way. Also, what can be a high priority to one group of Member States may not be so to another group. Therefore, for this medium term planning period no major shift in emphasis is proposed that would substantially increase effort in any one area at the expense of another. However, close attention will be paid, for example, to the distribution over the various subject areas of the requests received for technical co-

operation projects so as to discern any trends in priorities allocated by Member States. As a result, shifts of emphasis will be made inside the various areas as some subjects acquire greater importance and others are found to correspond to lower levels of priority.

Through the Agency's co-ordinated research programmes, increasing emphasis will be placed on assisting developing countries in strengthening their own capabilities to effectively conduct the research and development needed to solve problems and to apply the solutions to national development. At the same time the programmes will continue to be used for addressing problems common to a number of countries.

To the extent that experience in the transfer and practical application of nuclear technologies affirms their value, the Agency will increasingly encourage their incorporation into the mainstream of activities of national development programmes and the programmes of specialized international agencies. Technology transfer programmes along the lines of the model projects would maximize the impact of the Agency's contribution. Though this might reduce direct Agency involvement, the Agency would need to retain an overview of any radiation protection aspects of the broader use of nuclear techniques and may need to maintain a "quality assurance" function on the nuclear component of any activity.

Wherever possible, innovative and more cost-effective techniques will be used in the exchange of scientific and technical information, improving the quality of training and increasing the numbers of qualified individuals who can benefit from training programmes. Such techniques include computer based interactive training and "distant learning" programmes.

A more aggressive public information strategy will be employed to bring greater attention to the activities performed within this major programme. Particular attention will be given to the unique role of the laboratories at Seibersdorf and Monaco in support of the Agency's goals.

It is planned to continue work in all the major areas of food production and preservation. However, more emphasis will be given to implementing the concept of sustainability of food production and the incorporation of nuclear based molecular biology techniques into agricultural research and development. Also, research on increasing the efficiency of nutrient uptake by plants and the recycling of organic matter will be intensified, as will the transfer of the related technology. Additional training and laboratory support services will be provided on the application of molecular biology and other biotechnologies in vegetatively propagated crops as well as forage and feed crops. Other areas will be held to current levels or reduced over time.

The emphasis in animal production will change from support for immunoassay methodologies for identifying the constraints on productivity to the use of these methods to measure the effectiveness of interventions, such as vaccination programmes and alternative feed resources.

There will be a continuing emphasis on the use of the sterile insect technique (SIT) for control or eradication of fruit flies, tsetse flies and caterpillar pests. It is hoped that development work will demonstrate that the SIT can also be used against malaria mosquitoes. Nuclear techniques will be increasingly used for improving the efficiency of pesticides and for monitoring their effects on the environment.

The practical application of food irradiation will be assisted and further expansion of its use in Member States, on the basis of existing standards, will be supported.

In hydrology, the evaluation of groundwater resources remains an important task, especially in arid and semi-arid regions where knowledge of resources is generally poor and where it is essential to optimize groundwater exploitation. Work in this area will need to be undertaken in close collaboration with other international agencies. Of increasing importance is the question of water resources which are vulnerable to contamination or are already contaminated by pollution of an agricultural, industrial or urban origin. The management of water resources and the fight against pollution represent major challenges of the next century for the economic development of many countries. In addition, attention will be paid to the efficient use of fresh water in agriculture and the related salination of soils and aquifers.

Future activities directed towards the improvement of human health will build on the existing base but specific areas are targeted for increased emphasis. Expansion of nuclear medicine and radiotherapy centres in national networks will be supported, with the focus on strengthening indigenous skills and capabilities as well as on quality assurance of entire clinical processes. To this effect, the Agency will seek co-operation with national medical authorities and societies, as well as with WHO, to reach all users of nuclear medicine and radiotherapy equipment and establish mechanisms for the formal training of technologists and for the certification of specialists in nuclear medicine and radiotherapy. This co-operation will also be used to promote the production of simple, low cost instruments for nuclear medicine and radiotherapy with updated technology.

Several initiatives are envisioned. One will promote advances in molecular biology in the detection of hereditary diseases whose prevalence is still unknown in developing countries. Another will address the urgent need to improve the prognosis and cure rate of cancer therapy through co-ordination of Agency projects in radiotherapy with the efforts of PAHO/WHO to promote programmes for the early diagnosis of cancer, as well as the development of suitable protocols for cancer therapy management through the use of multicentre clinical trials. The scope of therapeutic applications of nuclear medicine will be widened by including more diseases against which other methods of treatment have proven less effective. The IAEA/WHO network of Secondary Standard Dosimetry Laboratories should be further utilized for quality assurance in radiotherapy. Efforts will be made to harmonize protocols for radiation sterilization of tissue grafts for surgical transplants with adherence to a total quality assurance system.

In human nutrition studies the focus will shift to providing a better scientific basis for public authorities to develop ways to introduce improvements, with special emphasis on nutritional therapies for infected, chronically malnourished children and pregnant and lactating women.

Nuclear and related techniques already established in nuclear research centres in developing countries will be used to assess local radioactive and non-radioactive environmental pollution.

Applications of nuclear and radiation technology in industrial development will emphasize the reduction of environmental degradation, and quality control and optimization of processes. Particular attention will be paid to the radiation treatment of industrial waste gases, including flue gases from power plants, waste water and sewage. In the area of medical

radioisotopes, emphasis will be placed on the production of short lived isotopes to minimize radiation exposure to the patient for diagnosis and therapy.

The Agency will continue to assist developing Member States in their efforts to make more effective use of their research reactors and particle accelerators for research, isotope production and industrial applications. Subject to the outcome of a review to be conducted in 1994, the Agency's involvement in the collection and provision of nuclear and atomic data will focus on the areas of fusion, nuclear safety, medicine and safeguards.

Nuclear instrumentation is indispensable in nearly every area relevant to the Agency's activities. Therefore, the Agency will continue its efforts to provide nuclear instrumentation and to train personnel in Member States to maintain and service the instruments and to use them accurately and effectively.

The Agency's Laboratories at Seibersdorf will emphasize those activities which are specific to the role of an international organization. Quality assurance will be further promoted in order to foster greater reliance in developing Member States on national and regional laboratories. Consequently, the emphasis will increasingly be on reference standards. Activities which contribute to environmental monitoring and protection, low input agriculture and sustainable agriculture practices will be stressed.

The Monaco Laboratory will carry out new work on the assessment of the consequences of the sea disposal of radioactive wastes and of nuclear accidents at sea. With the expected continuation of extrabudgetary support, it will increase its use of radiotracer and isotopic techniques in the study of marine contaminants and in the reconstruction of past oceanic pollution and climatic histories. It is expected to play a key international role in providing technical information and in building the capacity needed to meet the many marine environmental challenges facing the international community.

## VII. MAJOR PROGRAMME 3: NUCLEAR SAFETY AND RADIATION PROTECTION

### Current situation

A major Agency conference on the Safety of Nuclear Power: Strategy for the Future, held in September 1991, addressed the issue of the adequacy of the existing nuclear safety framework and formulated specific recommendations. These recommendations were reviewed by the General Conference in 1991, which identified directions for future work in Resolution GC(XXXV)/RES/997. While noting that the task of ensuring a high level of nuclear safety should remain the responsibility of national authorities, the General Conference stressed the need to strengthen international co-operation and to harmonize the international approach to all aspects of the subject. A step-by-step approach should gradually result in rules, guidelines, services and other activities which may be seen as an international nuclear safety regime and which should include the establishment of general safety principles, methods of verification of compliance, a comprehensive system of incident reporting and analysis, exchange of experience and peer reviews. Many of the elements of such an international regime are now in place.

Work is progressing on an international nuclear safety convention that will be binding for States ratifying it. An important aspect will be an obligation on parties to report at agreed intervals to a meeting of contracting parties on the national application of the principles laid down in the convention.

The Agency's overall activities in nuclear safety are related to: the development of standards and guides and the promotion of facilitating their implementation, including the fostering of information exchange; the collection and analysis of data; and the provision of advice and services in specific situations. However, the emphasis in the programme has shifted, for nuclear power plants, from the preparation of standards to provisions for the application of those standards.

Major efforts are being made by national and international authorities and experts in countries of the former USSR and in eastern and central European countries to upgrade the safety of nuclear installations. The activities of the Agency in this field focus on the implementation of consistent international safety assessments of various Soviet designed nuclear power plants and the elaboration of recommendations for upgrading their level of safety.

The services of Operational Safety Review Teams (OSART) and Assessment of Safety Significant Events Team (ASSET) missions, together with Engineering Safety Review Services (ESRS) and International Regulatory Review Teams (IRRTs), are rendered to Member States on request to assist them in the enhancement of safe plant operation.

The radiation safety programme covers a wide range of activities, including information exchange, research co-ordination, safety standard development and harmonization, practical assistance services and training. Together these provide a coherent and co-ordinated framework for promoting good radiation safety practices throughout Member States. The technical themes include occupational radiation protection, protection of the public and the environment, safe transport of radioactive material, the safety of radiation sources and emergency planning and preparedness.

A new edition of the Basic Safety Standards is being prepared to reflect the revised recommendations of the ICRP. Concurrently, a start is being made to review and update existing publications on the basis of the new Standards and to produce a number of new Safety Series and guidance documents.

Particular effort is being devoted to the preparation of appropriate safety standards and practical guidance on the safe operation and regulation of radiation sources, embracing occupational and public exposure control. Training and technical co-operation programmes are an essential element in familiarizing professionals in Member States with this guidance. In the countries of the former USSR, specific attention is being paid to the development of sound radiation safety infrastructures in a joint UNDP/IAEA project.

Radiation Protection Advisory Teams (RAPATs) to assess the current status of radiation safety have visited more than half the Agency Member States. In general, radiation safety has been enhanced through these visits but it has been found that a few Member States still have no infrastructure for radiation safety and in several other States the actual level of radiation safety is inadequate, meaning that they cannot comply with the Agency's Basic

Safety Standards. This raises doubts about the safety of the supply of radiation sources under technical co-operation projects.

## Outlook 1995–2000

Nuclear safety will remain a core area of Agency activity in the medium term. The need to ensure that nuclear power safety is at a high level everywhere will continue to be reconciled with the fact that safety remains the responsibility of individual governments.

The past effort devoted to establishing harmonized international safety norms will in the medium term be redirected increasingly towards reviewing and updating existing norms, and to addressing outstanding areas, namely:

- determining an acceptable level of safety for all operating nuclear power plants and research reactors built to earlier standards (for this purpose, a common basis needs to be agreed);
- developing safety principles for the design of future reactors.

It can be foreseen that towards the end of the period a lesser effort could be required in this area.

The achievement of excellent safety performance in all operating nuclear installations and organizations will remain central to the Agency's safety programme. Work will be directed towards providing international guidance, advice and assistance to national authorities and especially to nuclear regulatory bodies, with a view to assisting them in their work. To this end:

- Measures will be taken to help strengthen regulatory bodies and assistance will be provided directly to these bodies.
- Efforts will be directed towards devising a more systematic, integrated and thorough, but at the same time more transparent, system for overviewing the safety of operating nuclear installations and putting this system into effect through a rationalization of the Agency's safety services.
- Assistance will be provided to Member States in performing periodic reviews of nuclear power plants and research reactors built to earlier standards and in assessing and monitoring the effects of plant ageing on safety.

Although there will be an increase in demand for safety services in the shorter term, it is expected that Member States and the nuclear industry will take an increasing share in providing such services towards the end of the period, permitting a consolidation and reduction of the Agency's work in this area. The Agency will actively promote this trend. It must, however, continue to play a key role in the "quality control" of such international services.

The reporting requirements for a future international safety convention would probably be linked to a system of international peer review. The Agency might be asked to assist the parties in the review process and to function as the secretariat of the convention.

Radiation protection represents an area in which greater efforts will be needed in the medium term, partly as a result of the review of the recommendations of the ICRP, which will need to be translated into practical Agency standards.

In view of the findings of RAPAT missions, emphasis will be given to assisting many developing countries to incorporate international standards into detailed national regulations for radiation protection, in setting up authorities to supervise the implementation of such regulations and in enhancing the performance of such authorities.

Two developments have occurred that could in the medium term jeopardize the multi-modality principle of the IAEA Regulations for the Safe Transport of Radioactive Material and will require increased attention: new regulations have been proposed for the air transport of large quantities of radioactive material; and the International Maritime Organization (IMO) has adopted a Code of Practice for the Safe Carriage of Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes in Flasks on Board Ships, setting standards for the survival capability of ships carrying those materials. Dealing adequately with these challenges will require an increased collaboration and continuing dialogue between the Agency and the international organizations concerned.

## VIII. MAJOR PROGRAMME 4: SAFEGUARDS

### Current situation

The Agency plays a unique role in operating an international safeguards system that serves the overall objective of the non-proliferation of nuclear weapons and thereby facilitates international trade in nuclear material, hardware and technology and international co-operation in the nuclear field.

Despite zero real growth in the budget since 1985, the scope of the Agency's safeguards activities has increased very substantially. In part, this has been possible because of increased efficiency, especially in the implementation of safeguards. In particular, savings from new arrangements adopted for safeguards implementation in EURATOM have allowed safeguards resources to be applied in a number of new Member States. In addition, Member States have made available increasing resources outside the regular budget, for example in the form of cost free experts through national safeguards support programmes. Moreover, increasing "in kind" resources are being provided.

In addition to the application of safeguards in a larger number of countries, the Agency has also been called on to strengthen its ability to provide assurance about the completeness and correctness of material and facilities submitted to comprehensive safeguards agreements.

The Agency is implementing some measures for strengthening safeguards that have already been endorsed by the Board of Governors, including the early provision and use of design information, and a voluntary reporting scheme covering, essentially, exports and imports of nuclear material and exports of specified equipment and non-nuclear material. The Secretariat has also initiated field trials of selected environmental monitoring techniques for

safeguards purposes and is enhancing its treatment of safeguards relevant information in order to provide early indications of any nuclear activities inconsistent with a State's activities declared pursuant to its safeguards agreement. These measures can be expected to play an important role in a stronger safeguards system in the time frame of the Medium Term Plan.

The Agency's safeguards system is being modified to provide greater assurance that undeclared nuclear facilities and activities do not exist in States which have entered into comprehensive safeguards agreements with the Agency. This has stimulated discussions about the possibility of developing the system in such a way as both to strengthen the effectiveness of the system and to ensure that costs remain at a minimum consistent with effectiveness. These efforts may seem unreconcilable and, in the end, may prove to be so (although there may still be some room for reductions in per-unit inspection costs). Nevertheless, with the help of the Standing Advisory Group on Safeguards Implementation (SAGSI) and other advisory/consultant groups, the Agency is examining ways in which it might be possible to achieve both these goals.

The examination referred to includes a review of suggestions regarding "alternative safeguards approaches" which may include different ways of conducting safeguards that may have significant potential for cost savings. These suggestions involve, in various combinations: extended access for verification; greater use of unpredictability in verification activities; greater transparency of the nuclear activities of States; and fuller use of State Systems of Accounting and Control of Nuclear Materials (SSACs). Further development of these ideas and, where appropriate, field testing, will be necessary before conclusions can be drawn about cost-effectiveness and decisions made about implementation. This is being undertaken in a comprehensive programme that will develop, test as appropriate, and assess the technical, financial, legal and human resource aspects of seeking to enhance the Agency's ability to detect, and secure access to, any undeclared nuclear activities in States with comprehensive safeguards agreements. The programme, started in 1993, aims to define within two to three years a more cost-effective safeguards system covering both declared and undeclared nuclear activities. The results of the programme, together with the safeguards related outcome of the 1995 Review and Extension Conference of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), can be expected to have an impact on safeguards implementation and evaluation criteria for the period up to the year 2000.

The Secretariat has also initiated activities aimed at further reducing the cost of safeguards implementation including, inter alia, developing more efficient safeguards tools, techniques and procedures and increasing co-operation with SSACs. In addition, with a view to improving the utilization of staff resources, the Secretariat has presented several proposals for the consideration of the Board of Governors relating to the designation of safeguards inspectors by States and more effective deployment of inspectors. These proposals have already been accepted by a number of Member States; their wider acceptance would enable inspectors to be used in a more cost-effective manner.

## Outlook 1995–2000

The goal of activities under this programme will be to meet the requirements for assurance about the exclusively peaceful use of nuclear energy and to provide other verification services consistent with the Statute of the Agency. Growing nuclear disarmament

resulting in fewer nuclear weapons will make the reliability of verification even more important.

The amount of nuclear material and the number and complexity of nuclear facilities submitted to safeguards are expected to grow in the medium term, although the exact magnitude of this growth depends upon a number of factors that cannot be assessed with certainty. This growth will result in an increase in the Agency's safeguards workload.

It is expected for the medium term that comprehensive safeguards will be adopted in an increasing number of non-nuclear-weapon States. Argentina and Brazil are now introducing comprehensive safeguards. In the near future, the Newly Independent States of the former USSR (except for the Russian Federation) are expected to conclude safeguards agreements with the Agency as non-nuclear-weapon States parties to the NPT. The significant progress being made by nuclear weapon States on nuclear disarmament and reduced regional tension could result in other States considering the acceptance of comprehensive safeguards agreements. Further expansion of Agency safeguards activities could arise in connection with progress on the establishment of nuclear-weapon-free zones in the Middle East and elsewhere.

It is the Agency's experience that initiation of safeguards implementation in States having significant nuclear activities (some of the new States fall into this category) will require considerable effort from the Agency in seeking to verify the correctness and assess the completeness of the initial declarations of inventories of nuclear material and facilities.

The introduction of new tools which take advantage of the latest technology while conforming to standardization criteria should yield significant improvements. An appropriate balance will be maintained in this regard between development activities at the Agency and in Member States. Monitoring techniques based on digital electronics and radiation sensors may be introduced into integrated systems which operate unattended and/or provide data through remote transmission.

Analytical support by the Agency's Laboratories at Seibersdorf for the use of environmental monitoring techniques will be expanded and greater use will be made of the analytical laboratories in Member States. The Agency expects substantial support in this area from Member States, through the provision of both cost-free experts and extrabudgetary resources.

Given the factors described above, and despite the efforts of the Secretariat further to improve efficiency and reduce costs, it is likely that there will be an increase in the medium term in the overall costs of satisfying all existing and new safeguards obligations under the present safeguards approaches.

Beyond the "natural" growth of safeguards, there is a prospect that the Agency could undertake additional responsibilities, for example in relation to the introduction of an international confidence building arrangement for plutonium and highly enriched uranium. There is a possibility that the Agency could be asked: to apply safeguards to nuclear material transferred to peaceful use as a result of arms control and disarmament agreements; to verify the implementation of agreements to cease production ("cut-off") of special nuclear material for nuclear weapons in nuclear weapon States; and/or to verify compliance with a comprehensive test ban treaty. The Agency is already expected to contribute to international discussion of these issues and it should stand ready to respond positively if Member States

request it to undertake any additional functions. Essential to any new role in these areas would be an agreement on the appropriate funding arrangements. It is highly probable that verification through the Agency would be much more cost-effective than setting up new organizations or inspection mechanisms; an infrastructure is already in place. Nevertheless, the additional cost may be substantial.

In regard to the Agency's current safeguards mandate, the objective remains to verify that all nuclear material, facilities and activities that States have an obligation to declare and to place under international safeguards are so declared and are used exclusively for peaceful purposes.

To this end the following medium term goals will be pursued:

- To operate the Agency's safeguards system effectively on the basis of international, multilateral and bilateral agreements and to develop and introduce new approaches to strengthen the Agency's ability to detect nuclear material, facilities and activities that should have been submitted to safeguards.
- To complete a review of the present safeguards system and, if possible, to introduce safeguards procedures which would allow a reduction in Agency costs (or at least limit cost increases) while enhancing or maintaining the effectiveness of the system.
- To develop effective safeguards implementation techniques and approaches suitable for new large scale complex nuclear facilities and new technologies, mainly through co-ordinating development work in Member States.
- To conclude the safeguards agreements, subsidiary arrangements and facility attachments necessary for the application of comprehensive safeguards in all non-nuclear-weapon States, as required, and to develop appropriate safeguards implementation techniques and approaches for nuclear activities in these States, including the verification of the correctness and the assessment of the completeness of their declarations on initial inventories of nuclear material and facilities.
- To contribute to the preparation of the 1995 NPT Review and Extension Conference and to actively participate in this Conference; to present a comprehensive document describing Agency safeguards activities for the period since 1990, including measures taken for strengthening the effectiveness and improving the efficiency of the safeguards system.

## IX. MAJOR PROGRAMME 5: DIRECTION AND SUPPORT

A number of items shown under the heading of Direction and Support in the Programme and Budget structure have been considered under the previous major programme headings. This section focuses on in-house management issues.

### Senior management structure

The structure of the Agency has remained basically unchanged since the creation of the Department of Technical Co-operation in the mid-1960s. Developments foreshadowed in

this Medium Term Plan, for example in the fields of nuclear energy and safety, and verification, indicate that changes to the programme and organizational structure may have to be considered.

While there has been some increase in the resources available to management and policy functions, it is expected these will need to be further strengthened in the medium term to provide closer monitoring of resources, to facilitate changes in priorities and to strengthen policy planning and evaluation capabilities.

**Staffing, personnel policy and professional development**

The recruitment of the highest quality staff will remain vital, and vigorous efforts will continue to improve the representation of developing countries and of women.

To remedy the problems created by the freeze on professional staff salaries the Secretariat will work with the relevant Common System organs in order to seek to restore the attractiveness of the Agency as an employer of highly qualified staff and to link remuneration with performance.

Expected changes in the priorities within programmes, the introduction of new approaches to the delivery of programmes and the expected expansion of certain programmes and activities suggest that recruitment to some areas of the Agency will need to place greater emphasis on managerial abilities and attributes which will permit flexibility in staff deployment. A complementary strategy would ensure that for appointments to highly specialized positions the contracts would be explicitly short.

The Secretariat will need to give attention to the question of making maximum use of available staff resources. This examination should include a fresh look at how excellence can be rewarded in a work environment with few promotion prospects. It should also involve greater attention to "bottom-up" approaches which can encourage fuller contribution by all staff to the goals of the Agency.

Professional development and training in the Agency have been essentially "on the job". While this is to be encouraged, specialized training should be recognized as an important part of management functions and be integrated into personnel assessment systems. Inadequate attention has been given to formalized training. Such training is particularly important because many members of staff come to the Agency with limited management and international experience. There is perhaps not always clear recognition of the special goals of the Agency as an international organization or of the overriding significance of the interests of Member States.

Equally, staff must become aware that the Agency, like national institutions both private and public, has to be competitive. It is not sufficient to claim that the Agency is doing a good job; proof must be given that the job is being done more effectively than it could be by other organizations or institutions and that the product is of significance to a wide range of Member States. To this end, a programme evaluation system is being implemented, and will become an integral part of the Agency's work.

### Financial management

It is hoped that by the start of the 1995–2000 period the revised Financial Regulations and Rules will be in place and the Agency's budgeting and accounting structures will have been modified to provide the required degree of harmony and compatibility. In the medium term further work may be needed to improve these systems. There will also be a need to enhance and update the Financial Information and Control System (FICS), an undertaking for which additional funding will have to be sought.

Several years of experience with deferring programme activities while awaiting the receipt of arrears in Member State contributions have prompted the Secretariat to look for alternative solutions that would be simpler to handle. Options such as incentive schemes have been dismissed by most international organizations as being ineffective. The Agency's strategy for securing stable financing in the medium term will be based mainly on substantially increasing the level of the Working Capital Fund in line with ACC recommendations and recommendations received in the course of the review and revision of the Agency's Financial Regulations. A sufficiently large Working Capital Fund will obviate the need to defer programme activities by providing timely interim funding instead of deferral and disruption of approved programmes.

### Services and capital equipment

Responsibility for the buildings management, operation and maintenance of the Vienna International Centre will continue to be shared with the other United Nations tenants of the buildings. However, it is anticipated that as some of those other United Nations organizations reduce staff numbers (through reorganization or relocation) the Agency could be confronted with changes in the cost-sharing arrangements. There is an expectation that general maintenance costs will rise gradually with the age of the VIC facilities.

The Agency may itself require additional office space if it is to acquire major new responsibilities.

Capital equipment costs are expected to increase over the period of the Medium Term Plan owing primarily to replacement of the computer and telecommunications infrastructure. In particular, certain major outlays have been foreshadowed in connection with the telephone system. The provision of the Equipment Replacement Fund should provide an adequate mechanism for foreseeable major computer costs.

### External relations, legal services and public information

Demand for the services provided by the External Relations, Legal and Public Information Divisions (including responsibility for the implementation of certain programme activities and support for a wide range of other Agency activities) can be expected to increase. In particular, there is a growing need for policy support and legal advice in the areas of intergovernmental and inter-agency affairs, new nuclear verification proposals, and the development of legal instruments and nuclear safety infrastructures. Greater public interest in Agency activities will demand an increased public information effort.

ANNEX

## *SOME MECHANISMS INVOLVED IN THE AGENCY'S WORK*

### Meetings

Agency meetings related to the programme are held for a variety of reasons:

- Worldwide exchange of information on, and review of, a major subject area (conferences, symposia and some seminars). The results are published in proceedings.
- Narrower exchange of information on, and review of, a specialized subject area (Technical Committees and Specialists Meetings). The results are published.
- Review of draft texts of proposed publications to ensure Member State input and consensus (Advisory Groups, Technical Committees and consultants). The final texts are published.
- Review of ongoing or final results from co-ordinated research programmes to provide cross-fertilization of ideas and summarize the findings (research co-ordination meetings). The results of the final meetings are sometimes published.
- Instruction of regional or interregional groups on a particular subject or practical technique (seminars). The material from periodic courses is occasionally published.

Meetings remain essential for the fulfilment of the Agency's role in advancing the use of nuclear technology and in the transfer of that technology. During the period of the Medium Term Plan, the demand for meetings is expected to grow and restraint will be required to avoid overloading national authorities and the Secretariat. Accordingly, it is intended to maintain a limit on the number of meetings. Advantage will be taken of the evolution of technology (teleconferencing, electronic mail services) to reduce the number of meetings in cases where other, equally effective, means of achieving the results become available.

### Databases

The gathering of data, its processing and its dissemination in printed or electronic form have become established parts of the Agency's activities. The databases currently maintained under Agency programmes include: EEDB, INES, INIS, INTURGEO, IRS, ISIS, NFCIS, PRIS, RRDB, WMDB, a number of databases related to the safe transport of radioactive material and various atomic and nuclear data sets (see attachment for an explanation of the acronyms). The rationale for this aspect of the Agency's work has been the uniquely comprehensive access to information that the Agency has from its Member States and can provide to its Member States. Some of the databases are intended primarily for internal use by the Secretariat and others mainly as sources of information to Member States.

During the period of the Medium Term Plan, all databases intended primarily for external use will be reviewed and modified (or phased out) to ensure that:

- The databases provide unique information that cannot more effectively be compiled by other organizations.
- Updating is carried out on a reasonable time-scale.
- Significant use is made of the data by a range of Member States. In this connection, it should be noted that it is general Agency policy to seek payment whenever possible for the use of databases. Willingness to make such payment will demonstrate real interest in the product.
- The method of delivery of the data to the user takes account of the best accepted technology, allowance being made for the fact that the information must be accessible by all Member States.

In particular, in relation to INIS, expected initiatives over the period of the Medium Term Plan include: improvements in efficiency, flexibility and user-friendliness and in the availability and accessibility of the full text of reported literature in optical or electronic form; increased co-operation with other database producers and information hosts; and comprehensive promotional campaigns.

## Research contract activities

The Agency arranges contracts (with awards currently averaging $5000 per annum) and agreements (no funds awarded) with institutes in Member States for carrying out research projects related to the scientific programmes. Most of these contracts and agreements are components of co-ordinated research programmes under which participants from both developing and industrialized countries perform specified research tasks towards a common goal. Co-ordinated research programmes can be very effective in solving significant problems and also in strengthening research capabilities in developing countries, by encouraging international collaboration in pursuit of common research goals. Participants attend periodic meetings organized by the Agency.

About three quarters of the activities are in support of research in applications of nuclear techniques. The remainder are devoted to nuclear power and safety.

The Agency's co-ordinated research programmes will increasingly place emphasis on assisting developing countries in strengthening their own capabilities to effectively conduct the research and development needed to solve their own problems and to apply them for national development. To this end the criteria for the selection of participants under the programme will be reviewed.

The demand for research contracts may increase during the period of the Medium Term Plan. However, growth will be dependent on the level of funding available and the capacity for support within the scientific Departments.

### Laboratory services

The Agency is the only organization within the United Nations family which directly operates multidisciplinary research laboratories. The laboratories provide scientific services to Member States in food and agriculture, human health, environmental, marine and earth sciences, physical and chemical sciences, radiation protection and safeguards analyses.

The scientific services provided to the various programmes by the Agency's Laboratories at Seibersdorf and at Headquarters and by the Marine Environment Laboratory at Monaco are given essentially in three forms: quality control, the provision of reference materials and isotopes, and chemical and radiochemical analyses; research and development associated with co-ordinated research programmes, technical co-operation projects and interorganizational and intergovernmental programmes; and training of scientists from developing countries.

The demand for laboratory services and training is expected to increase over the period of the Medium Term Plan, reflecting the needs of developing countries to make increasing use of nuclear techniques and the growing recognition of the value to the international community of the work the laboratories perform. The growing involvement of the laboratories in work relating to environmental monitoring and the Agency's expanded responsibilities in relation to non-proliferation will necessitate an expansion of the personnel base and increased resources for facilities and equipment.

### Other services

In its other support activities — computer services, publishing and printing, translation and the VIC Library — the Agency will follow closely developments in technology that offer increases in efficiency and effectiveness and will adopt them wherever they promise improvements in the quality of the services provided. It is likely that in the time period of the Medium Term Plan such technological developments will be substantial and their introduction will lead to considerable benefits. As particular examples, increased use is likely to be made of: local area network, telecommunications and distributed database technologies; document supply services; dissemination of information on CD-ROM and other electronic media; printing on demand; and workstation support facilities for translators.

*Database acronyms*

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| EEDB | Energy and Economic Data Bank |
| INES | International Nuclear Event Scale |
| INIS | International Nuclear Information System |
| INTURGEO | International Uranium Geology Information System |
| IRS | Incident Reporting System |
| ISIS | International Safeguards Information System |
| NFCIS | Nuclear Fuel Cycle Information System |
| PRIS | Power Reactor Information System |
| RRDB | Research Reactors Database |
| WMDB | Waste Management Data Base |