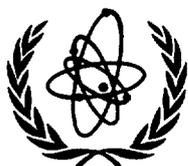


THE
AGENCY'S PROGRAMME
AND BUDGET
FOR 1989 AND 1990

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INTERNATIONAL ATOMIC ENERGY AGENCY

THE AGENCY'S PROGRAMME AND BUDGET FOR 1989 AND 1990

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LIST OF ABBREVIATIONS

ADBF	Division of Budget and Finance
ADEX	Division of External Relations
ADGS	Division of General Services
ADIT	Internal Audit
ADLA	Division of Languages
ADMS	Office of Management Services
ADPI	Division of Public Information
ADPR	Division of Personnel
Agency	International Atomic Energy Agency
AGM	Advisory group meeting
ARCAL	Regional Co-operative Arrangements for the Promotion of Nuclear Science and Technology in Latin America
ASSET	Analysis of Safety-Significant Events Team
BAPMoN	Background Air Pollution Monitoring Network
BIPM	Bureau international des poids et mesures
BSS	Basic Safety Standards for Radiation Protection
CANDU	Canada deuterium-uranium [reactor]
CCAQ	Consultative Committee on Administrative Questions
CEC	Commission of the European Communities
CIAMDA	Computer Index of Atomic and Molecular Data
CIDA	Canadian International Development Agency
CINDA	Computer Index of Neutron Data
CMEA	Council for Mutual Economic Assistance
CRP	Co-ordinated research programme
CS	Consultant services
C/S	Containment and surveillance
DANIDA	Danish International Development Agency
DDG AD; NE; RI; SG; TC	Deputy Director General for Administration; Nuclear Energy and Safety; Research and Isotopes; Safeguards; Technical Co-operation
Division of Food and Agriculture	Joint FAO/IAEA Division of Isotope and Radiation Applications of Atomic Energy for Food and Agricultural Development
Division for Standardization	Division for Standardization, Training and Administrative Support
EEl	Edison Electric Institute
ELISA	Enzyme-linked immunosorbent assay

EURATOM	European Atomic Energy Community
FAO	Food and Agriculture Organization of the United Nations
FBR	Fast breeder reactor
GCR	Gas-cooled reactor
GS	General Service category (staff)
HEU	High-enriched uranium
HLW	High-level waste
HTGCR	High-temperature gas-cooled reactor
HWR	Heavy-water reactor
IA	Office of Internal Audit and Evaluation Support
IAEA	International Atomic Energy Agency
IATA	International Air Transport Association
IBRD (World Bank)	International Bank for Reconstruction and Development
ICAO	International Civil Aviation Organization
ICIPE	International Centre for Insect Physiology and Ecology (Nairobi)
ICRP	International Commission on Radiological Protection
ICSC	International Civil Service Commission
ICTP	International Centre for Theoretical Physics (in Trieste)
IDAS	International Dose Assurance Service
IEA	International Energy Agency
IFFIT	International Facility for Food Irradiation Technology
IFRC	International Fusion Research Council
IIASA	International Institute for Applied Systems Analysis
ILO	International Labour Organisation
IMO	International Maritime Organization
INDC	International Nuclear Data Committee
INIS	International Nuclear Information System
INPO	Institute of Nuclear Power Operations
INSARR	Integrated Safety Assessment of Research Reactors
INTOR	International Tokamak Reactor
INTURGEO	International Uranium Geology Information System
IRPA	International Radiation Protection Association
IRS	Incident Reporting System
ISIS	IAEA Safeguards Information System
ISO	International Organization for Standardization
ITC	International Trade Centre

ITER	International Themonuclear Experimental Reactor
IUPAC	International Union of Pure and Applied Chemistry
IUPAP	International Union of Pure and Applied Physics
IWG	International working group
LEU	Low-enriched uranium
LMFBR	Liquid metal fast breeder reactor
LWR	Light-water reactor
MAED	Model for Analysis of Energy Demand
M&O	Maintenance and Operatives Service category (staff)
m/m	Man-month
MOX	Mixed oxide
NDA	Non-destructive assay
NDT	Non-destructive testing
NEA	Nuclear Energy Agency (of OECD)
NENF	Division of Nuclear Fuel Cycle
NENP	Division of Nuclear Power
NENS	Division of Nuclear Safety
NERC	North American Electric Reliability Council
NESI	Division of Scientific and Technical Information
NFCIS	Nuclear Fuel Cycle Information System
NNW State	Non-nuclear-weapon State
NPP	Nuclear power plant
NPT	Treaty on the Non-Proliferation of Nuclear Weapons (reproduced in document INFCIRC/140)
NUSSAG	Nuclear Safety Standards Advisory Group
NUSS programme	Agency's programme on nuclear safety standards for nuclear power plants
OAS	Organization of American States
ODA	Overseas Development Administration (United Kingdom)
OECD	Organisation for Economic Co-operation and Development
OSART	Operational Safety Review Team
P	Professional category (staff)
PRA	Probabilistic risk analysis
PRIS	Power Reactor Information System
PSA	Probabilistic safety assessment
QA	Quality assurance

QC	Quality control
RAPAT	Radiation Protection Advisory Team
RB	Regular Budget
RCA	Regional Co-operative Agreement for Research, Development and Training Related to Nuclear Science and Technology
RDS	Reference Data Series
RIA	Radioimmunoassay
RIAL	Agency's Laboratory (Seibersdorf)
RIFA	See Division of Food and Agriculture
RILS	Division of Life Sciences
RIML	International Laboratory of Marine Radioactivity (in Monaco)
RIPC	Division of Physical and Chemical Sciences
RITP	See ICTP
SAC	Scientific Advisory Committee
SAGSI	Standing Advisory Group on Safeguards Implementation
SAGSTRAM	Standing Advisory Group on the Safe Transport of Radioactive Materials
SAL	Safeguards Analytical Laboratory
SEC	Secretariat of the Policy-making Organs
SGDE	Division of Development and Technical Support
SGEV	Division of Safeguards Evaluation
SGIT	Division of Safeguards Information Treatment
SGOA	Division of Operations (A)
SGOB	Division of Operations (B)
SGOC	Division of Operations (C)
SGSA	See Division for Standardization
SIDA	Swedish International Development Authority
SIR	Safeguards Implementation Report
SIT	Sterile insect technique
SMPR	Small and medium power reactor
SNSP	Supplementary nuclear safety and radiation protection programme
SPM	Specialists' meeting
SSDL	Secondary Standard Dosimetry Laboratory
TC	Technical co-operation

TCAC	Division of Technical Assistance and Co-operation
TCM	Technical committee meeting
TCPU	Division of Publications
Tlatelolco Treaty	Treaty for the Prohibition of Nuclear Weapons in Latin America
TLD	Thermoluminescence dosimetry
Trieste Centre	See ICTP
TRS	Technical Reports Series
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UN-DTCD	United Nations Department of Technical Co-operation for Development
UNEP	United Nations Environment Programme
UNIDO	United Nations Industrial Development Organization
UNIPEDE	International Union of Producers and Distributors of Electrical Energy
UNITAR	United Nations Institute for Training and Research
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
UPU	Universal Postal Union
US-AID	United States Agency for International Development
USDA	United States Department of Agriculture
USDOE (USDE)	United States Department of Energy
VIC	Vienna International Centre
WAMAC	Radioactive Waste Management Advisory Committee
WASP	Wien Automatic System Planning Package
WEC	World Energy Conference
WHO	World Health Organization
WMO	World Meteorological Organization
World Bank (IBRD)	International Bank for Reconstruction and Development

NOTE

All sums of money are expressed in United States dollars.

INTRODUCTION

GENERAL

1. In accordance with Article XIV.A of the Statute, the Board of Governors hereby submits to the General Conference the Agency's programme and budget estimates for 1989 and 1990. The Board requests the General Conference to adopt the draft resolutions in respect of 1989 set forth in Annex III.

2. The budget estimates for 1990 have been prepared with the same degree of detail and accuracy as those for 1989 and are considered to be a realistic assessment of the financial resources which will be necessary for the implementation of the 1990 programme. They may, however, require to be adjusted as a result of possible changes in programme emphasis or of factors outside the control of the Agency. The estimates for 1990 will be presented to the General Conference at its thirty-third regular session.

FORMAT

3. The usefulness of the general format introduced for the programme and budget for 1985-86 was confirmed in discussions on the 1987-88 programme and has consequently been retained, with some minor modifications, for the present document. A new feature in the preparation of the programme for the biennium 1989-90 was the thorough and intensive analysis of programme trends in the light of the changing needs of Member States which was undertaken by the Secretariat and the representatives of Member States before proceeding with the detailed formulation of the work programme. The first step in this process was the preparation and distribution to Governors on 18 February 1987 of a document outlining programme trends, problems to be solved in Member States and the possible contribution of the Agency to the solution of those problems. In April and May 1987, meetings of senior programme managers were arranged within the Secretariat to discuss the Agency's long-term goals and strategies. In these discussions senior staff from the Department of Technical Co-operation contributed the results of their analysis of requests for assistance from developing countries in the various areas of the Agency's work. The discussions resulted in the following:

- Identification of problems facing Member States and falling within the scope of the Agency's work;
- Identification of countries interested in individual activities;
- Definition of the Agency's role with respect to the problems identified and of areas on which its efforts would focus in the period 1989-90 and possibly thereafter;
- Assignment of priority rankings to projects.

4. A further round of informal consultations and discussions on the programme took place with groups of Member States between November 1987 and February 1988.

5. The programme set out in the present document is based on the results of the discussions described above and on the comments made by the Scientific Advisory Committee. Support was expressed by Member States' representatives for the more thorough definition of the Agency's goals and the assignment of priorities. This will be taken into account when formulating future biennial programmes. However, in order to keep the programme and budget document for 1989-90 as concise as possible, the information relating to the analytical part of the programming exercise is not repeated in the document.

PROGRAMME TRENDS

Nuclear Power

6. The advice given in 1986-87 by the Senior Expert Group on Mechanisms to Assist Developing Countries in the Promotion and Financing of their Nuclear Power Programmes has had a considerable influence on the content of the 1989-90 programme. A series of guidebooks and manuals providing general guidance on the development of planning capabilities in the energy and electricity supply and demand area has been largely completed and efforts will now focus more on giving assistance through country-specific projects in which an integrated planning package will be offered. Such assistance will be supplemented by workshops for users of the Agency's energy planning models (WASP, MAED, etc.), seminars for decision-makers and advisory services aimed at assessing the overall level of preparedness of developing countries to undertake a nuclear power programme. Steps are being taken to ensure the more active participation of the World Bank in this work. With regard to the development of the infrastructure needed to implement nuclear power programmes, the Agency will concentrate on providing assistance with manpower development, feasibility studies and project management.

7. As regards the technical and economic performance of nuclear power plants, it is planned to strengthen the Power Reactor Information System (PRIS) by obtaining the participation of all Member States operating nuclear power plants and by taking steps to encourage the early transmission of data. More attention will be paid to the analysis of PRIS data, and information obtained from Operational Safety Review Team (OSART) missions and data from the Incident Reporting System (IRS) will be taken into account as part of this analysis. Other areas which will continue to receive emphasis are qualification standards for plant operating personnel, the man-machine interface and quality management in the design, construction and operation of nuclear power plants.

8. Where nuclear power systems technologies are concerned, the principal goal will be to offer an effective international forum for the exchange of information. In the case of fission reactors, attention will centre on Member States' efforts to enhance safety, simplicity and better resource utilization through evolution, backfitting and the development of new designs of current power reactors. In the nuclear fusion field, the International Tokamak Reactor (INTOR) project conducted under the Agency's auspices from 1979 to 1987 will be replaced by a more ambitious conceptual design study for the next-step tokamak experiment (ITER - International Thermonuclear Experimental Reactor). The participants in the project will be the same as for INTOR, namely the European Community, Japan, the United States and the Soviet Union.

Nuclear Fuel Cycle

9. An important component of this programme will continue to be the maintenance and updating of a comprehensive picture of world nuclear fuel resources through the biennial publication - jointly with OECD/NEA - of a report assessing uranium resources and supply (the "Red Book"). Work begun in the late 1970s on the preparation of comprehensive documentation on the characteristics and recognition criteria of world uranium deposits is expected to be completed in 1991. An up-to-date picture of world resources will be maintained through the International Uranium Geology System (INTURGEO) and the periodic revision of the world atlas of uranium deposits.

10. With respect to the assessment and development of nuclear raw material resources and the processing of nuclear and reactor materials, a number of technical documents, guidebooks and manuals will be drawn up. These will deal with selected aspects of technology, economics and safety and will supplement the country-specific assistance provided through technical co-operation (TC) projects. In giving this assistance, the trend will be towards regional projects and an integrated or multidisciplinary approach. An important aspect in the period 1989-90 will be the publication (in co-operation with the "Radiation Protection" programme) of a number of radiation protection safety standards, guides and manuals relating to specific nuclear fuel cycle facilities.

11. Activities concerning fuel performance will receive high priority, with more attention being paid to nuclear safety and economic aspects. This work will be more closely linked to related activities being carried out in the nuclear power systems technologies area.

12. In the spent fuel management area, nuclear safety, economics and technology development will continue to be the dominant aspects, with emphasis on advanced spent fuel storage concepts (dry storage, rod consolidation, etc.).

Radioactive Waste Management

13. As regards the handling, treatment, conditioning and storage of radioactive waste, the main activities will be the development of safety guidelines and criteria, the elaboration of quality assurance concepts, procedures and standards for the solidification process of alpha-bearing high-level waste and conditioned spent fuel, and the provision of waste management assessment, planning and technology review services. The assistance given to Member States in the processing and storage of wastes from nuclear applications will be considerably expanded. Many countries which use radiation and nuclear methods in agriculture, medicine and industry or operate nuclear research establishments but have not yet embarked upon nuclear power and fuel cycle activities need to establish an organizational infrastructure and capacity for waste processing and storage. The Agency will support national programmes through a concerted effort combining training courses, advisory missions, support for research, the development of a standard design for waste processing and storage facilities which will meet the needs of the countries in question, and the preparation of supplementary technical documents. In this context, special attention will be paid to the safe use and disposal of radiation sources employed in industry, medicine, research and teaching: the first steps to implement an action plan drawn up jointly under the "Radiation Protection" and "Radioactive Waste Management" programmes are being taken in 1988.

14. With regard to radioactive waste disposal, efforts will focus on the exchange of information on technology and engineering development as well as on the formulation of a comprehensive set of safety codes and acceptance criteria for the underground disposal of radioactive waste. It is expected that international agreement will be reached on exemption principles for determining what type of radioactive materials and what level of radioactivity can be released without being subject to regulatory requirements. Guidance on the practical application of such principles will be drawn up. The next review by the Agency of the Definition and Recommendations on radioactive matters established in connection with the London Dumping Convention is due in 1990. This will be based on the results of the Agency's activities in this area since 1985 and on the actual status of sea dumping activities, which have at present been suspended.

15. The primary objective of the International Laboratory of Marine Radioactivity will continue to be to enhance the marine radioactivity monitoring capabilities of national laboratories through the provision of analytical quality control services and the training of staff from institutes in Member States. It will also continue to conduct research and collect information on the behaviour and impact of radionuclides discharged to the marine environment both intentionally and accidentally.

16. With regard to the decontamination and decommissioning of nuclear installations, the main emphasis will be on decommissioning project planning, management and cost estimation, various aspects of regulatory guidance, and the review of trends in technology development, including remote decommissioning systems.

Food and Agriculture

17. Through a programme conducted jointly with FAO, the Agency will continue to promote the use of selected nuclear techniques for the solution of problems in food and agriculture which are of economic importance for developing Member States. An important feature in the period in question will be closer co-operation with other international organizations which are co-ordinating large-scale international programmes, the aim being to contribute to the practical solution of specific problems through the use of nuclear methods and techniques. Examples are the contribution of mutation breeding technology to a large-scale FAO project in Africa aimed at improving basic food crops; the use of radioimmunoassay diagnostic methods in the Pan-African Rinderpest Campaign, a foot-and-mouth disease campaign in Latin America and a trypanosomiasis campaign in Africa executed by FAO and a number of other specialized international institutions; and the use of the sterile insect technique in a large-scale FAO medfly project in Central America.

18. In food irradiation, the emphasis will be on stimulating the development of national regulations for the safe operation of food irradiation facilities and for trade in irradiated foodstuffs on the one hand, and on assisting developing countries in introducing the use of irradiation for food preservation on the other. In providing the latter assistance, greater use will be made of a regional approach.

19. The fundamental role played by the Agency's Laboratory at Seibersdorf in support of agricultural activities will be further expanded in 1989-90 with

the construction of additional premises equipped with training and demonstration laboratories.

Human Health

20. Nuclear medicine, radiation therapy and dosimetry will continue to be the dominant activities in this area and will continue to be carried out in close co-ordination with WHO. In nuclear medicine, a number of specific projects will aim at strengthening local nuclear diagnostic services. Through regional arrangements, it is planned to assist developing countries in establishing indigenous capabilities for producing and applying reagents for the diagnosis of communicable diseases and for studying thyroid function in iodine-deficient areas. Chiefly through the co-ordination of research and the provision of training, the Agency will help developing countries to introduce in vivo diagnostic investigations for dynamic studies of organ function (lung, heart and brain) and for the early diagnosis of cancer. As a supplement to this work, institutes in developing countries employing sophisticated nuclear instruments will receive support aimed at improving their skills in preventive maintenance and quality control. In addition, studies will continue to be made of the cost-effectiveness of nuclear and non-nuclear procedures in order to help developing countries select the most appropriate diagnostic strategies. In the period 1989-90, these studies will concentrate on comparing ultrasound and nuclear imaging techniques for the diagnosis of liver diseases common in developing countries and on comparing the relative cost of radioimmunoassay methods and non-nuclear enzyme-linked assays for the diagnosis of infectious hepatitis. In radiotherapy for cancer treatment, efforts will focus, in close co-operation with WHO, on supporting and strengthening radiation therapy activities in Africa and on developing more accurate methods for dose planning.

21. In the dosimetry area, support will continue for the long-established IAEA/WHO network of Secondary Standard Dosimetry Laboratories (SSDLs). In view of the growing number of radiation processing facilities, the International Dose Assurance Service (IDAS) established in 1986 will be expanded.

22. In the light of increasing concern over human exposure to toxic pollutants and deficiencies in human nutrition, especially as regards trace elements, it is planned to expand efforts under the "Human Health" programme to promote the use of nuclear techniques for analysis and assessment in this area. The Agency will contribute to a number of international projects being conducted in this field by FAO, WHO and WMO.

23. The Agency's Laboratory will continue to provide experimental facilities for equipment calibration in radiation metrology, to develop analytical methods which are relevant to radiation and environmental protection, and to provide training in the use of such methods.

Industry and Earth Sciences

24. In promoting nuclear techniques for various applications, attention will focus on the conditions prevailing in, and needs of, developing countries. The main areas dealt with will be the optimization of industrial processes (including the assessment of resulting environmental pollution),

radiation processing, and non-destructive testing. The individual tasks planned under this area have been selected with a view to facilitating the transfer of nuclear technology through country-specific assistance, the main vehicle for which is the TC programme.

25. In hydrology, attention will continue to focus on the exploration and assessment of water resources as well as on the development of geothermal resources. The principal activities will be regional hydrology projects for arid zones in North Africa in support of a large-scale UNDP project on water resources assessment; assessing the applicability of nuclear techniques to the evaluation of aquifer vulnerability to pollution; and adapting mathematical models for interpreting tracer data in water resources assessment and providing training in their use. In providing direct assistance to developing countries, more attention will be given to regional projects aimed at building up local expertise in nuclear hydrology. The Agency's Laboratory will continue to support development work and country-specific assistance and to offer analytical support for an international survey of isotopes in precipitation.

26. With regard to the use of nuclear methods in the exploration, processing and preprocessing of mineral resources, a major event will be a symposium in 1990 to review important developments which have taken place in this field in recent years.

Physical and Chemical Sciences

27. The International Centre for Theoretical Physics (ICTP) will continue to provide opportunities for physicists to take part in courses, meetings and research activities, most of which are of great relevance to scientists working in developing countries. The Centre will also sponsor a number of selected activities in physics held in Third World countries. Sponsorship of such activities will be closely co-ordinated with similar activities of the Third World Academy of Sciences.

28. In addition to the Centre's continuing efforts to aid individual scientists working in developing countries, increasing emphasis will be given - through the network of associate members and of federated institutes - to encouraging the development of centres of excellence in such countries and to strengthening their ties with other such centres elsewhere.

29. The Centre will also continue to organize a series of courses in various regions to acquaint Third World physicists with the latest micro-processor technology, which is now accessible even to institutions with very modest resources.

30. The Centre's programme of fellowships in Italian laboratories will continue to provide a number of young physicists with the opportunity to broaden their laboratory experience considerably. It is hoped that other countries will follow Italy's example.

31. In applied nuclear physics, the overall objective of the regular programme will continue to be the strengthening of capacities and capabilities in developing countries to operate, fully utilize and maintain nuclear instrumentation and to carry out accurate measurements. As more than half the

TC projects in this field involve supplying nuclear instrumentation and giving advice to universities in developing countries, the work conducted under this area represents an important contribution to manpower development for the whole field of nuclear applications. Training will be an important component of the programme, and methods and instrument kits will be developed for use in training. The country-specific assistance offered will include advice on the selection and ordering of nuclear equipment and the assessment of measurement capabilities.

32. Activities under the nuclear data programme will mainly concern the following: the assessment of the status of and requirements for data, especially nuclear and atomic data for nuclear safety, nuclear fusion, radiotherapy, radioisotope production, nuclear geophysics and safeguards; the collection and dissemination of bibliographic and numerical experimental and evaluated data; data processing and validation, and the production of handbooks and numerical data bases and publications; and finally, the provision of data centre services and of training in the use of nuclear and atomic data.

33. As regards the utilization of research reactors and particle accelerators, activities concerning research reactor core conversion will have been completed by 1990. More attention will be given to research reactor renewal and upgrading.

34. In the chemistry area, efforts will continue to be directed principally towards building up developing country capabilities in the quality control of radiopharmaceuticals and in the performance of reliable chemical and nuclear analyses in mineral exploration, environmental control, nutrition and industry. The programme of analytical quality control carried out by the Agency's Laboratory and based on intercomparisons and the provision of reference analytical materials will play a vital role in providing direct assistance to as many as 100 institutes, mainly in developing countries.

Nuclear Safety and Radiation Protection

35. The Agency's safety activities have traditionally been divided into two separate programmes, namely nuclear safety and radiation protection. While these two disciplines still concern different areas of interest and therefore involve distinct activities, the philosophy and criteria in radiation protection and nuclear safety and the practical implementation thereof have tended to converge in recent years. This process has become more evident in the international response to the Three Mile Island and Chernobyl accidents. It is expected that this trend will continue during the 1989-90 period, particularly where basic principles and standardized safety assessment techniques are concerned, and it may in future lead to a restructuring of the Agency's programme in radiation protection and nuclear safety.

36. In the period 1989-90, greater attention will be paid under both programmes to the establishment and strengthening of radiation protection and nuclear safety infrastructures in Member States by fostering the exchange of information, promoting research and development, consolidating understanding on key international issues, establishing standards, and providing advisory missions. In this context, a new project (H.6.01) on "Safe Use and Control of Radiation Sources" has been established.

37. A further new feature is the initiation or strengthening of activities concerning safety aspects of nuclear power plant ageing, safety aspects of accident management and mitigation, radiation safety in nuclear fuel-related activities and the safe operation of research reactors.

38. Activities in one expanding area - assisting Member States to develop and implement standardized safety assessment techniques - have been grouped together in a separate area of activity (H/I), since such standardized methodologies can be used equally for radiation protection and nuclear safety purposes.

39. During the Board's discussions on the 1988 budget, it was suggested that activities under the Supplementary Nuclear Safety and Radiation Protection Programme (SNSP) be incorporated in the relevant core programmes in the next budget cycle, and this has been done for the 1989-90 programme. Studies initiated under the SNSP in 1987 and relating to the Chernobyl facility and its environment will have been largely completed by the end of the 1989-90 period. The same is true of studies and work on the formulation of recommendations that were started as a result of the Chernobyl accident but which also apply to other facilities or general situations. However, a number of long-term activities - the majority of which were started before 1986 - are expected to continue at an enhanced level, as decided by the Board in the light of lessons learned from the Chernobyl and other accidents.

Safeguards

40. In several Member States a moderate expansion of nuclear electricity generation programmes is continuing and highly advanced technologies - computerized process control systems, remote handling equipment and robotics - are being incorporated into new, large-scale fuel cycle facilities. As a consequence, safeguards approaches and verification measures are becoming increasingly complex. In addition, the number of nuclear facilities and, in particular, the quantities of various nuclear materials subject to safeguards continue to increase.

41. Inspection goal attainment is used as the primary indicator of safeguards effectiveness. The percentage of nuclear facilities in which inspection goals were attained grew from 53% in 1984 to 63% in 1986. While this represents solid progress, there is still considerable scope for improvement.

42. During the period 1989-90, it is planned to undertake efforts to:

- Reduce substantially the number of subsidiary arrangements and facility attachments outstanding at the end of 1988;
- Improve the co-ordination of safeguards implementation and liaison with State authorities; this will include providing assistance in the establishment and operation of national systems for accounting for and controlling nuclear material subject to safeguards;

- Re-assess the responsibilities of Member States and the Secretariat under safeguards support programmes with a view to maximizing the benefit which the Agency's verification activities derive from such programmes;
- Enhance the overall quality of safeguards activities by broadening and strengthening the understanding of quality assurance requirements within the inspectorate;
- Initiate a long-term programme aimed at improving safeguards effectiveness and efficiency, taking into account new technological developments and updated inspection goals.

43. In order to reflect better the above plans within the 1989-90 programme, the structure of the safeguards programme has been modified by comparison with the previous biennium.

44. A comprehensive assessment has been made of the minimum inspection effort required for the period 1989-90. As a result, a new basis has been established which is lower than the former PLARIE (planned routine inspection effort) figure. The new figure is based on past experience and makes modest allowance for possible unplanned interruptions in the operation of existing nuclear facilities or delays in starting up new facilities. The new approach establishes the minimum frequency of inspections required and thus makes it essential to have sufficient manpower capacity to ensure 100% coverage of the planned inspection effort. However, owing to manpower limitations in 1989, 100% coverage may not be achieved.

Technical Assistance and Co-operation

45. It is expected that funding levels for technical co-operation will continue to increase compared with the previous biennium, the total estimated volume for 1989-90 approaching \$90 million.

46. In addition to handling a higher volume of technical assistance, efforts will be made to improve the quality and timeliness of the technical assistance delivered using feedback from systematic evaluations, which are being carried out in increasing numbers. In 1989-90, a two-year programming cycle will be introduced so as to achieve more rational and integrated project assistance and to permit greater efficiency in implementation. More careful appraisal of project requests, the judicious use of computerized systems and intensified monitoring may make it possible to enhance programme impact and quality within existing budgetary constraints.

47. By the end of 1989, the computerized management information system, which covers all technical co-operation activities and related financial data, will enable persons involved in supporting technical co-operation activities to have ready access to the relevant information through on-line retrieval. Increased emphasis will be placed on linking the technical Departments to this system as well as to office automation facilities available in the Department of Technical Co-operation, in order to ensure a more cohesive and integrated approach to all aspects of technical co-operation management.

BUDGETARY MATTERS

Exchange Rate

48. For the purpose of presenting the budget estimates for 1989 and 1990, an exchange rate of 12.70 Austrian schillings to the United States dollar - the operational rate in effect at the time of the last session of the General Conference in September 1987 - has been used. In order to facilitate comparison, the 1988 budget estimates are presented at the same exchange rate, i.e. AS 12.70.

49. As the average of the United Nations exchange rates used to record actual expenditures during 1987 was very close to this rate, i.e. AS 12.64, all figures within the document are directly comparable.

50. Since the initial adoption by the General Conference at its twenty-ninth session of a "split system" of appropriations and assessments [1], appropriations correspond to the requirements of programme implementation in spite of currency fluctuations. Expenditures recorded in the books are directly comparable with the ceilings authorized by the General Conference in the appropriation resolution, which increases transparency and facilitates control.

51. In line with the procedure adopted in 1985, Resolution A in Annex III, which has an attachment containing the adjustment formula, will be presented to the General Conference also at the United Nations exchange rate applicable in September 1988, in order to provide the General Conference with an up-to-date picture, in dollars, of the 1989 appropriation.

The Regular Budget for 1989

52. The total of the Regular Budget estimates for 1989 as shown in Table 54, the Regular Budget by Appropriation Section, is \$157 540 000 at an exchange rate of 12.70 schillings to the dollar. The Regular Budget by Department is shown in Table 55 and by Item of Expenditure in Table 56.

53. The Regular Budget estimates for the Agency's programmes for 1989 show no expenditure increase at 1988 prices. The 1989 figures are \$18 000 below those for 1988.

54. As can be seen from Table 54, there are expenditure increases in two Appropriation Sections - an expenditure increase of \$1 501 000 under Appropriation Section 5, Safeguards, and of \$105 000 under Appropriation Section 1, Technical Assistance and Co-operation. In Section 5 the additional resources will be required to keep safeguards assurance at the same level as hitherto. In Section 1, the increase is due to the additional manpower which is needed to cope with the increase in the technical co-operation programme.

55. Expenditure decreases are foreseen in Appropriation Section 2, Nuclear Energy and Safety (\$1 086 000), Appropriation Section 3, Research and Isotopes (\$233 000), Appropriation Section 4, Operational Facilities (\$72 000) and Appropriation Section 7, Executive Management and Administration (\$233 000).

[1] GC/XXIX/RES/446

In accordance with the plan to phase out the SNSP gradually, a reduction of \$831 000, at 1988 prices, has been foreseen for 1989 under Appropriation Section 2 (\$631 000) and Section 3 (\$200 000). The expenditure decreases reflect in part cuts in programmes, in part savings which will not affect the programme (lower air fares, reducing the size and duration of meetings, etc.).

56. The decrease in Appropriation Section 4, Operational Facilities, reflects an adjustment in charges for services rendered, mainly to the ICTP.

57. The decrease in Appropriation Section 7, Executive Management and Administration, is attributable to the phasing out of the traineeship programme financed from the Regular Budget, and its replacement by a cheaper and, it is hoped, more cost-effective Junior Professional Officer programme. Three annual temporary assistance traineeship positions will be created for junior (P-1 level) officers from developing countries who will be assigned to technical Departments to receive training in selected areas. In addition, five new Professional posts in the Department of Safeguards (Appropriation Section 5) will not be filled and the resources thus released will be partly used for training, in 1989, five junior professionals from developing countries, who will subsequently be better qualified to apply for regular positions within that Department.

58. Appropriation Section 9, Shared Support Services, which comprises "Work for Others", (ie., services rendered mainly to other organizations at the VIC) is expected to show a decrease of \$259 000 in 1989 in respect of Library and Data Processing Services. The two services are affected differently by this decrease. Some reductions represent variable costs, such as the number of book and journal acquisitions made by the Library. Other reductions, however, represent a reduction in services which are based on a shared, fixed-cost resource, such as staff and equipment, which cannot be easily adjusted in the short term. In this case, as has been pointed out on previous occasions, the reduction in the use of these services by others can only be accommodated over a longer period in order to avoid a corresponding increase in the charges to be borne by the Agency. Outside users of these services have been made aware of this situation.

59. For 1990, an expenditure increase of 1.4% over 1989 has been foreseen for Agency programmes.

60. Price increases for the items of expenditure making up the Agency's Regular Budget are expected to amount to 4.5% for 1989.

61. In calculating price increases, the principle of "semi-full budgeting" has been applied, as in past years. This means that for salaries and related items which depend on index movements, trends and expectations are taken into account, while for all other items only those increases which have already occurred during the past year are recovered.

62. Since the timing and effect of the lifting of the freeze on Professional post adjustment and of the survey to be conducted by the International Civil Service Commission (ICSC) cannot be predicted with certainty, a slight increase of 2.5%, including some allowance for within-grade increments, has been assumed for Professional staff costs in 1989.

63. For General Service staff the 10.5% salary increase reflects the increase which became effective in 1987 but was not budgeted for, and additional within-grade increments. Common staff costs are assumed to be 34% of salaries for established posts and temporary assistance.

64. On the basis of detailed analyses of the various types of equipment and supplies procured by the Agency and of the various cost items relating to travel as well as to research and other contracts concluded by the Agency, the price increases for "Other direct costs" total 2.2%, as can be seen from Table 56, the Regular Budget by Item of Expenditure. Within this average of 2.2%, 3.5% is foreseen in respect of VIC Operating Costs, as this percentage was used by UNIDO, the organization in charge of VIC operations, in its 1988/89 estimates.

65. The increases in the various shared costs are derived from increases in the individual items of expenditure in the relevant Shared Support Services.

66. For 1990, price increases totalling 3.9% over 1989 have been foreseen. The difference between the two years is related to staff cost assumptions: for 1990 "normal" increases have been assumed, as shown in Table 56, while for 1989 increases are "abnormally" high for General Service, and low for Professional staff.

67. It is proposed that the Regular Budget estimates for 1989 of \$157 540 000 be funded, after deduction of estimated income of \$9 009 000, by an assessment on Member States of \$148 531 000 (see Table 3, Regular Budget, Summary of Income). The assessment for 1989 represents an increase of \$6 567 000 over the assessment for 1988, all figures being presented at an exchange rate of AS 12.70.

68. The economic difficulties facing Member States have made it necessary in recent years to restrict the growth of resources employed by the Agency in implementing its programmes. The efficient and effective use of the limited resources which are at the Agency's disposal is therefore a major concern of both Member States and the Secretariat. Efforts continue to be made to increase the productivity of the Agency.

69. In preparing the programme and budget for 1989 and 1990, these efforts have resulted in savings which have made it possible to increase the volume of activity by more than the increase in expenditure, or to maintain the same volume of activity while reducing expenditure.

70. There is always some uncertainty associated with the measurement of the volume of activity; however, since the aim is not exactness but rather to achieve a general improvement and to make this improvement visible, the simple methods employed can be considered useful for this purpose.

71. For safeguards, the number of man-days of inspection (days at facilities) serves as a useful measurement unit. The planned targets of 10 600 man-days for 1989 and 12 000 man-days for 1990, compared with the figure of 10 000 man-days for 1988, represent a greater increase than in the cost per man-day for 1989 and 1990, at 1988 prices, compared with the cost per man-day for 1988.

72. In other areas, variations in the volume of activities are measured by the number of meetings, publications, co-ordinated research programmes and so on. These tasks are identified as "main means" for achieving the Agency's objectives. A description of "main means" is given below in paragraphs 74-83.

73. Calculations performed using this approach show that the volume of activities proposed in the 1989-90 programme budget will increase by about 5.0% for the two-year period, which corresponds to 3.3% on an annual basis. This increase in activity is to be achieved with a 0.7% increase in resources for the two-year period (0.47% per annum). Expected efficiency gains are therefore estimated to be 4.3% for the two-year period or 2.8% on an annual basis.

Categories of Main Means in the 1989/90 Programme Budget

74. As in previous years, the concept of "main means" is used in Part I of the budget document to categorize the principal activities involved in implementing the approved programmes. It is hoped that use of this concept, rather than of "items of expenditure", will make it clearer to Member States what final products they can expect to obtain from the Agency.

75. In this sense, small meetings such as advisory group and technical committee meetings are inputs similar to "items of expenditure"; they are not associated directly with the generation of a final product for Member States. Accordingly, they are not shown as a separate "main means".

76. "Major Meetings" reflect the costs of providing a forum for the exchange of information (conferences, symposia, seminars), including the costs of manpower required for preparing and holding meetings. Meetings such as advisory group and technical committee meetings are included in this category only if they are associated with the planning of a conference, symposium or seminar.

77. "Publications" reflect the costs of preparing reports, guidelines, proceedings, manuals and other publications. These costs include costs of staff, consultants and printing and editing. The costs of advisory group and technical committee meetings held in conjunction with the preparation of publications are included in this category.

78. "Standards and Regulations" mainly reflect the costs of Safety Series documents. As in the case of "Publications", the costs associated with "Standards and Regulations" include costs of staff, consultants, printing and editing, advisory group meetings and technical committee meetings.

79. "Data Base" reflects the costs associated with setting up and maintaining specific data bases such as the Power Reactor Information System, Nuclear Fuel Cycle Information System, International Nuclear Information System, International Uranium Geology Information System and Computer Index of Atomic and Molecular Data. Included are staff costs, data processing and other computer costs and the costs of meetings held to exchange information or to provide data base training.

80. "Research and Development" reflects the costs of co-ordinated and other research programmes, including the costs of administration, staff, laboratory services, consultants and the preparation of reports.

81. "Services to Member States" reflect the actual costs of advisory services and missions as well as laboratory and other services which are financed from the Regular Budget, including associated staff costs.

82. "Technical Co-operation Support" reflects the staff costs associated with the support given by the technical Departments to the technical co-operation programme in selecting and briefing experts, designing training course programmes, evaluating equipment and similar activities. In addition, part of the costs of the Trieste Centre and the Seibersdorf and Monaco Laboratories is considered to represent support for technical co-operation.

83. "Inspecting" relates only to the Department of Safeguards and covers all safeguards implementation activities.

Extrabudgetary Resources

84. In general, the dollar amounts for extrabudgetary resources are tentative and represent the best estimates that can be made at present. Some amounts represent requests made by the Agency and some are reasonable expectations based on past experience; several are still subject to confirmation.

85. In Part I of the document, the tables include, at the Area of Activity level, amounts of extrabudgetary resources expected to be available for the Agency to carry out its programme in 1989 and 1990, without reference to prospective donors. This information is summarized, by year, in the Attachment to Tables 1-4, Total Resources for Implementation in 1989 and 1990. In these tables and the Attachment, funds from other United Nations organizations are shown separately. Table 4 provides details of expected extrabudgetary resources by donor country. Apart from confirmed contributions, reasonable expectations have been included and footnoted.

Target for Voluntary Contributions to the Technical Assistance and Co-operation Fund

86. The provision of technical assistance by the Agency to its developing Member States is financed from the Technical Assistance and Co-operation Fund, which receives its income mainly in the form of voluntary contributions, for which a target is set each year. On the basis of an annual increase of 12% in the indicative planning figure, the Board recommends that the target for 1989 be established at \$42 million. Taking into account miscellaneous income, it is expected that the Fund will amount in total to \$43 million.

87. In Part I of the document the project tables include, at the Area of Activity level, amounts of technical co-operation resources expected to be available for implementation in 1989-90. These amounts do not constitute targets for or limitations on funds and do not in any way prejudice the

technical co-operation programme for 1989, the details of which will be approved by the Board separately. The figures are based mainly on extrapolations from the past and give a tentative order of magnitude of total resources (Regular Budget, extrabudgetary and technical co-operation resources) for each Area of Activity.

Working Capital Fund

88. The Agency's Working Capital Fund has, with minor variations, remained at the same level - namely \$2 million - since 1958. For 1989, the Board recommends that the Fund be increased to the level of \$4 million.

ORGANIZATIONAL CHART AND MANNING TABLE

89. As mentioned in paragraph S/2, the Office of Internal Audit and Management Services has assumed the task of assisting and overseeing the evaluation of technical programmes.

90. In this connection and in view of the Director General's desire that both internal audit activities and support for the evaluation of the Agency's technical programme executed under the Regular Budget become more closely linked to the functions of his Office, it is proposed to transfer the internal audit service within the organizational chart so that it falls directly under the authority of the Director General.

91. Since the objective of the management services provided at present by the Office of Internal Audit and Management Services is to provide consultation services and advice to all Departments on organizational and management issues, it is appropriate for this function to remain under the authority of the Deputy Director General for Administration. Consequently, it is proposed to separate this function from internal audit activities and to have it performed by an Office of Management Services within the Department of Administration. This separation of management services from internal audit should help ensure the objectivity of the latter. The above changes do not involve any additional manning table posts.

92. Requests for additional manpower and the reclassification of existing posts have been scrutinized through the internal review process established for the purpose of reviewing human resource requirements in the light of programme trends and developments as well as the overall work-load situation and staff utilization.

93. For 1989, an increase of 16 Professional posts and 9 GS posts is considered necessary. Justifications are provided in the text accompanying Table 60.

94. In order to make full use of available manning table positions, several posts have been redeployed. The transfers are shown in Table 63, Transfer of Posts in 1988.

95. It is not planned to fill the post of the Director of the Division of Publications. The Heads of the two Sections (Publishing and Printing) within this Division will report directly to the Deputy Director General for Technical Co-operation. The possible restructuring of this Division is under consideration.

96. For 1990, the staffing situation cannot be reviewed in the same manner since a number of decisions may depend on programme implementation in 1989, and hence no requests for new posts in 1990 are being submitted at the present time. The overall budgetary estimates are none the less considered to be appropriate, since manpower is only one of the possible resources for implementing the programme.

REPORT ON THE BUDGET TO THE GENERAL ASSEMBLY OF THE UNITED NATIONS

97. In accordance with Article XVI of the Agency's relationship agreement with the United Nations (INFCIRC/11, Part I), the budget will be reviewed by the Advisory Committee on Administrative and Budgetary Questions, which will report on the administrative aspects thereof to the General Assembly of the United Nations.

T A B L E S 1 - 4

RESOURCES FOR PROGRAMME IMPLEMENTATION FROM THE REGULAR BUDGET AND
FROM OTHER UN ORGANIZATIONS - 1989

Table 1 (a)

Programme Area / Programme	Regular Budget estimates	%	Funds from other UN organizations a/
1. NUCLEAR POWER AND THE FUEL CYCLE			
A. Nuclear Power	6 557 000	4.3	-
B. Nuclear Fuel Cycle	2 233 000	1.5	-
C. Radioactive Waste Management	4 419 000	2.9	-
Sub-Total	13 209 000	8.7	-
2. NUCLEAR APPLICATIONS			
D. Food and Agriculture	8 015 000	5.2	1 407 000
E. Human Health	4 458 000	2.9	320 000
F. Industry and Earth Sciences	2 679 000	1.8	-
G. Physical and Chemical Sciences	6 821 000	4.5	400 000
Sub-Total	21 973 000	14.4	2 127 000
3. NUCLEAR SAFETY AND RADIATION PROTECTION			
H. Radiation Protection	4 240 000	2.8	-
I. Safety of Nuclear Installations	5 235 000	3.4	-
Sub-Total	9 475 000	6.2	-
4. SAFEGUARDS			
J.1. Planning, Direction, Co-ordination, Control and Evaluation	[439 000]	b/ -	-
J.2. Safeguards Operations	26 802 000	17.6	-
J.3. Safeguards Support	25 681 000	16.9	-
Sub-Total	52 483 000	34.5	-
S. DIRECTION AND SUPPORT			
S.1. General Management and Secretariat of the Policy-making Organs	9 121 000	6.0	-
S.2. Administration	11 705 000	7.7	-
S.3. Technical Co-operation Servicing and Co-ordination	8 471 000	5.5	-
S.4. General Services	16 798 000	11.0	-
S.5. Specialized Service Activities	7 614 000	5.0	-
S.6. Shared Support Services c/	1 474 000	1.0	-
Sub-Total	55 183 000	36.2	-
Total Agency programmes	152 323 000	100.0	2 127 000
Services provided to others	5 217 000		-
TOTAL	157 540 000		2 127 000
SOURCE OF FUNDS			
Assessment on Member States	148 531 000		-
Income from work for others	5 217 000		-
Other miscellaneous income	3 792 000		-
Other UN organizations	-		2 127 000
TOTAL	157 540 000		2 127 000

a/ Funds from FAO, UNDP, UNEP, UNESCO, WHO etc.

b/ Included in S.1 - General Management and Secretariat of the Policy-making Organs.

c/ Includes only the Library, all other services having been allocated to the user programmes

RESOURCES FOR PROGRAMME IMPLEMENTATION FROM THE REGULAR BUDGET AND
FROM OTHER UN ORGANIZATIONS - 1990

Table 1 (b)

Programme Area / Programme	Regular Budget estimates	%	Funds from other UN organizations a/
1. NUCLEAR POWER AND THE FUEL CYCLE			
A. Nuclear Power	6 782 000	4.2	-
B. Nuclear Fuel Cycle	2 358 000	1.5	-
C. Radioactive Waste Management	4 381 000	2.7	-
Sub-Total	13 521 000	8.4	-
2. NUCLEAR APPLICATIONS			
D. Food and Agriculture	8 189 000	5.0	1 408 000
E. Human Health	4 588 000	2.9	320 000
F. Industry and Earth Sciences	2 666 000	1.7	-
G. Physical and Chemical Sciences	7 033 000	4.4	400 000
Sub-Total	22 476 000	14.0	2 128 000
3. NUCLEAR SAFETY AND RADIATION PROTECTION			
H. Radiation Protection	4 459 000	2.8	-
I. Safety of Nuclear Installations	5 586 000	3.5	-
Sub-Total	10 045 000	6.3	-
4. SAFEGUARDS			
J.1. Planning, Direction, Co-ordination, Control and Evaluation	[312 000]	b/ -	-
J.2. Safeguards Operations	30 582 000	19.1	-
J.3. Safeguards Support	26 538 000	16.5	-
Sub-Total	57 120 000	35.6	-
S. DIRECTION AND SUPPORT			
S.1. General Management and Secretariat of the Policy-making Organs	9 363 000	5.8	-
S.2. Administration	12 199 000	7.6	-
S.3. Technical Co-operation Servicing and Co-ordination	8 922 000	5.6	-
S.4. General Services	17 399 000	10.8	-
S.5. Specialized Service Activities	7 902 000	4.9	-
S.6. Shared Support Services c/	1 542 000	1.0	-
Sub-Total	57 327 000	35.7	-
Total Agency programmes	160 489 000	100.0	2 128 000
Services provided to others	5 384 000		-
TOTAL	165 873 000		2 128 000
SOURCE OF FUNDS			
Assessment on Member States	156 813 000		-
Income from work for others	5 384 000		-
Other miscellaneous income	3 676 000		-
Other UN organizations	-		2 128 000
TOTAL	165 873 000		2 128 000

a/ Funds from FAO, UNDP, UNEP, UNESCO, WHO etc.

b/ Included in S.1 - General Management and Secretariat of the Policy-making Organs.

c/ Includes only the Library, all other services having been allocated to the user programmes

THE REGULAR BUDGET

By programme area and programme

Table 2

Programme Area / Programme	1988 Budget	Expenditure increase(decrease) %	1989 at 1988 prices	Expenditure increase(decrease) %	1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase		
1. NUCLEAR POWER AND THE FUEL CYCLE											
A. Nuclear Power	6 271 000	22 000	0.4	6 293 000	(16 000)	(0.3)	6 277 000	4.2	6 557 000	3.7	6 782 000
B. Nuclear Fuel Cycle	2 218 000	(64 000)	(2.9)	2 154 000	40 000	1.9	2 194 000	3.7	2 233 000	3.5	2 358 000
C. Radioactive Waste Management	4 230 000	6 000	0.1	4 236 000	(187 000)	(4.4)	4 049 000	4.3	4 419 000	3.7	4 381 000
Sub-Total	12 719 000	(36 000)	(0.3)	12 683 000	(163 000)	(1.3)	12 520 000	4.1	13 209 000	3.7	13 521 000
2. NUCLEAR APPLICATIONS											
D. Food and Agriculture	7 622 000	28 000	0.4	7 650 000	(124 000)	(1.6)	7 526 000	4.8	8 015 000	3.8	8 189 000
E. Human Health	4 394 000	(115 000)	(2.6)	4 279 000	(39 000)	(0.9)	4 240 000	4.2	4 458 000	3.8	4 588 000
F. Industry and Earth Sciences	2 215 000	344 000	15.5	2 559 000	(110 000)	(4.3)	2 449 000	4.7	2 679 000	4.0	2 666 000
G. Physical and Chemical Sciences	6 877 000	(368 000)	(5.4)	6 509 000	(66 000)	(1.0)	6 443 000	4.8	6 821 000	4.2	7 033 000
Sub-Total	21 108 000	(111 000)	(0.5)	20 997 000	(339 000)	(1.6)	20 658 000	4.6	21 973 000	4.0	22 476 000
3. NUCLEAR SAFETY AND RADIATION PROTECTION											
H. Radiation Protection	4 373 000	(295 000)	(6.7)	4 078 000	59 000	1.4	4 137 000	4.0	4 240 000	3.7	4 459 000
I. Safety of Nuclear Installations	5 959 000	(926 000)	(15.5)	5 033 000	150 000	3.0	5 183 000	4.0	5 235 000	3.7	5 586 000
Sub-Total	10 332 000	(1 221 000)	(11.8)	9 111 000	209 000	2.3	9 320 000	4.0	9 475 000	3.6	10 045 000
4. SAFEGUARDS											
J.1. Planning, Direction, Co-ordination, Control and Evaluation	-	-	-	-	-	-	-	-	[439 000] a/	-	[312 000] a/
J.2. Safeguards Operations	25 013 000	859 000	3.4	25 872 000	2 491 000	9.6	28 363 000	3.6	26 802 000	4.1	30 582 000
J.3. Safeguards Support	24 046 000	653 000	2.7	24 699 000	(51 000)	(0.2)	24 648 000	4.0	25 681 000	3.5	26 538 000
Sub-Total	49 059 000	1 512 000	3.1	50 571 000	2 440 000	4.8	53 011 000	3.8	52 483 000	3.8	57 120 000
S. DIRECTION AND SUPPORT											
S.1. General Management and Secretariat of the Policy-making Organs	8 833 000	(118 000)	(1.3)	8 715 000	(136 000)	(1.6)	8 579 000	4.7	9 121 000	4.2	9 363 000
S.2. Administration	11 286 000	(223 000)	(2.0)	11 063 000	-	-	11 063 000	5.8	11 705 000	4.2	12 199 000
S.3. Technical Co-operation Servicing and Co-ordination	7 922 000	105 000	1.3	8 027 000	71 000	0.9	8 098 000	5.5	8 471 000	4.4	8 922 000
S.4. General Services	16 012 000	-	-	16 012 000	-	-	16 012 000	4.9	16 798 000	3.6	17 399 000
S.5. Specialized Service Activities	7 145 000	74 000	1.0	7 219 000	-	-	7 219 000	5.5	7 614 000	3.8	7 902 000
S.6. Shared Support Services b/	1 395 000	-	-	1 395 000	-	-	1 395 000	5.6	1 474 000	4.7	1 542 000
Sub-Total	52 593 000	(162 000)	(0.3)	52 431 000	(65 000)	(0.1)	52 366 000	5.2	55 183 000	4.1	57 327 000
Total Agency programmes	145 811 000	(18 000)	0.0	145 793 000	2 082 000	1.4	147 875 000	4.5	152 323 000	3.9	160 489 000
Services provided to others	5 183 000	(259 000)	(5.0)	4 924 000	(34 000)	(0.7)	4 890 000	6.0	5 217 000	3.9	5 384 000
TOTAL REGULAR BUDGET	150 994 000	(277 000)	(0.2)	150 717 000	2 048 000	1.4	152 765 000	4.5	157 540 000	3.9	165 873 000
Less: Miscellaneous income											
Income from work for others	5 183 000	(259 000)	(5.0)	4 924 000	(34 000)	(0.7)	4 890 000	6.0	5 217 000	3.9	5 384 000
Other	3 847 000	(183 000)	(4.8)	3 664 000	(246 000)	(6.7)	3 418 000	3.5	3 792 000	3.9	3 676 000
Assessment on Member States	141 964 000	165 000	0.1	142 129 000	2 328 000	1.6	144 457 000	4.5	148 531 000	3.9	156 813 000

a/ Included in S.1 - General Management and Secretariat of the Policy-making Organs.

b/ Agency's share of the Library.

THE REGULAR BUDGET

Summary of Income ^{a/}

Table 3

Item	1987 Actuals	1988 Budget	Increase (decrease)	1989 Estimate	Increase (decrease)	1990 Estimate
Assessed contributions on Member States	136 378 959	141 964 000	6 567 000	148 531 000	8 282 000	156 813 000
Miscellaneous income						
(a) Income from work for others						
Data processing services	1 574 647	1 560 000	5 000	1 565 000	21 000	1 586 000
Printing services	1 554 168	1 677 000	128 000	1 805 000	68 000	1 873 000
Medical services	572 514	615 000	37 000	652 000	25 000	677 000
Library services	760 545	1 130 000	(148 000)	982 000	46 000	1 028 000
Radiation protection services		201 000	12 000	213 000	7 000	220 000
Sub-total	4 461 874	5 183 000	34 000	5 217 000	167 000	5 384 000
(b) Attributable to specific programmes						
Publications of the Agency - INIS	448 558	614 000	(117 000)	497 000	(25 000)	472 000
Publications of the Agency - Other	951 626	758 000	390 000	1 148 000	(91 000)	1 057 000
Laboratory income	176 605	202 000	(27 000)	175 000	-	175 000
INIS/AGRIS/Direct Access income	227 128	301 000	(61 000)	240 000	-	240 000
Amounts recoverable under Safeguards agreements	161 928	270 000	(20 000)	250 000	-	250 000
Programme support income	501 842	700 000	(50 000)	650 000	-	650 000
Other Service income	7 687	2 000	-	2 000	-	2 000
Sub-total	2 475 374	2 847 000	115 000	2 962 000	(116 000)	2 846 000
(c) Not attributable to specific programmes						
Investment and interest income	2 028 100	800 000	(150 000)	650 000	-	650 000
Gain on exchange of currencies	26 804	-	-	-	-	-
Other	175 494	200 000	(20 000)	180 000	-	180 000
Sub-total	2 230 398	1 000 000	(170 000)	830 000	-	830 000
Total miscellaneous income	9 167 646	9 030 000	(21 000)	9 009 000	51 000	9 060 000
TOTAL CONTRIBUTIONS AND MISCELLANEOUS INCOME	145 546 605	150 994 000	6 546 000	157 540 000	8 333 000	165 873 000

a/ An exchange rate of 12.70 Austrian schillings to the United States dollar was used for 1988, 1989 and 1990 estimates. The average United Nations exchange rate for 1987 was AS12.64.

EXTRABUDGETARY RESOURCES 1988 - 1990
(as known on 15 July 1988)

a/
Table 4 (excluding contributions in kind)

	Unused balances as at 1 January 1988	1988 Estimate	1989 Estimate	1990 Estimate
Technical Assistance and Co-operation				
Australia (RCA)	-	350 000 c/	360 000 c/	340 000 c/
Austria	98 125	- d/	- d/	- d/
Belgium	67 314	- d/	- d/	- d/
Canada	2 688	- d/	- d/	- d/
Chile	767	8 000	- d/	- d/
European Economic Community (ARCAL)	107 381	93 000	93 000	37 000
Finland	411	- d/	- d/	- d/
Germany, Federal Republic of	1 174 995	- d/	- d/	- d/
Italy	972 840	515 000 d/	530 000 d/	480 000 d/
Japan (RCA)	292 623	364 000	393 000 c/	425 000 c/
Korea, Republic of	-	70 000	- d/	- d/
Kuwait	125 744	- d/	- d/	- d/
Norway	4 613	- d/	- d/	- d/
Saudi Arabia	4 229	- d/	- d/	- d/
Sweden	225 799	288 000	300 000	- d/
Union of Soviet Socialist Republics	1 726 985	1 325 000	- d/	- d/
United Kingdom of Great Britain and Northern Ireland	707 483	888 000	888 000	888 000
United States of America	2 336 335	1 500 000	- d/	- d/
Sub-total	7 848 332 b/	5 401 000 b/	2 564 000 b/	2 170 000 b/
Nuclear Power				
Canada	4 530	40 000	-	-
Germany, Federal Republic of	89 091	-	-	-
Sub-total	93 621	40 000	-	-
Nuclear Fuel Cycle				
Germany, Federal Republic of	-	20 000	39 000	-
United States of America	-	-	62 000 c/	62 000 c/
Sub-total	-	20 000	101 000	62 000
Nuclear Safety				
Finland	15 103	100 000	100 000 c/	100 000 c/
Germany, Federal Republic of	-	41 000	83 000	-
Japan (RCA)	-	46 000	50 000 c/	53 000 c/
Netherlands	147 461 h/	- h/	- h/	-
United States of America	45 497	101 000	93 000 c/	93 000 c/
Sub-total	208 061	288 000	326 000	246 000

Table 4 (continued)

	Unused balances as at 1 January 1988	1988 Estimate	1989 Estimate	1990 Estimate
Food and Agriculture				
Australia (RCA)	67 889	-	-	-
Germany, Federal Republic of	65 007	40 000	-	-
International Consultative Group on Food Irradiation (ICGFI)	94 884	124 000	124 000	124 000
Italy	541 909	1 417 000	2 718 000	1 978 000
Japan (RCA)	11 014	-	-	-
Netherlands	(59 476)	420 000	420 000	-
Sweden	153 699	390 000	-	-
United States of America	14 993	-	150 000 c_/	150 000 c_/
Sub-total	889 919	2 391 000	3 412 000	2 252 000
Life Sciences				
Canada	-	62 000	83 000	83 000
European Economic Community (ARCAL)	-	127 000	108 000	-
Italy	296 000	159 000	105 000	-
Japan (RCA)	329 729	140 000	150 000 c_/	150 000 c_/
United States of America	36 706	43 000	58 000	58 000
Sub-total	662 435	531 000	504 000	291 000
Physical and Chemical Sciences				
Australia (RCA)	15 991	-	-	-
Germany, Federal Republic of	66 635	-	150 000 c_/	150 000 c_/
India (RCA)	-	50 000	50 000 c_/	50 000 c_/
Italy	127 042	150 000	-	-
United States of America	50 133	-	-	-
Sub-total	259 801	200 000	200 000	200 000
Agency's Laboratory, Seibersdorf				
Austria	-	350 000	350 000	-
Germany, Federal Republic of	250 000	-	-	-
Italy	-	-	400 000	400 000
United States of America	300 000	200 000	150 000	-
Sub-total	550 000	550 000	900 000	400 000
International Centre for Theoretical Physics				
Brazil	-	10 000	10 000	10 000
Iran, Islamic Republic of	-	20 000	20 000	20 000
Italy	6 502 e_/	15 890 000 f_/	13 320 000 f_/	13 320 000 f_/
Japan	-	31 000	30 000	30 000
Kuwait	-	75 000	75 000	75 000
Qatar	-	10 000	10 000	10 000
Sweden	-	208 000	208 000	-
Sub-total	6 502	16 244 000	13 673 000	13 465 000

Table 4 (continued)

	Unused balances as at 1 January 1988	1988 Estimate	1989 Estimate	1990 Estimate
International Laboratory of Marine Radioactivity				
Denmark	(3 403)	-	-	-
Germany, Federal Republic of	30 589	60 000	60 000	40 000
Principality of Monaco	60 283	100 000	100 000	100 000
Switzerland	(493)	-	-	-
United States (National Science Foundation)	88 609	67 000	20 000	20 000
Sub-total	175 585	227 000	180 000	160 000
Safeguards				
Canada	(48 636)	270 000	- g/	- g/
Finland	-	50 000	- g/	- g/
France	103 905	100 000	- g/	- g/
German Democratic Republic	-	100 000	- g/	- g/
Germany, Federal Republic of	169 832	500 000	- g/	- g/
Italy	114 454	100 000	- g/	- g/
Japan	90 936	500 000	- g/	- g/
Sweden	10 083	155 000	- g/	- g/
Union of Soviet Socialist Republics	389 455	100 000	- g/	- g/
United Kingdom of Great Britain and Northern Ireland	71 059	80 000	107 000	77 000
United States of America	216 594	2 200 000	- g/	- g/
Sub-total	1 117 682	4 155 000	107 000	77 000
Administration				
Italy	397 300	-	200 000	400 000 c/
United States of America	14 516	181 000	-	-
Sub-total	411 816	181 000	200 000	400 000
TOTAL	4 375 422	24 827 000	19 603 000	17 553 000

a/ In addition to the cash resources indicated above, Member States make contributions in kind consisting of cost-free experts and consultants, stipends for fellowships, training courses, etc.

b/ These figures are not included in the total extrabudgetary resources. They are shown separately in the Attachment to Tables 1 - 4

c/ No fixed commitment has yet been received.

d/ No indication of a pledge has yet been received.

e/ Includes unused balances of the Third World Academy of Sciences.

f/ Includes Italy's contributions to the Third World Academy of Sciences.

g/ No firm commitment has been received to date but it is expected that extrabudgetary funding will continue at about the same level as 1988.

h/ The unused balance as at 1 January 1988 includes resources received in 1987 but planned for implementation in 1988 and 1989

ATTACHMENT TO TABLES 1 - 4

TOTAL RESOURCES FOR IMPLEMENTATION IN 1989

Programme Area / Programme	Regular Budget estimates	Funds from other UN organizations a/	TC resources b/	Other extra- budgetary resources	TOTAL
1. NUCLEAR POWER AND THE FUEL CYCLE					
A. Nuclear Power	6 557 000	-	2 593 000	-	9 150 000
B. Nuclear Fuel Cycle	2 233 000	-	1 353 000	-	3 586 000
C. Radioactive Waste Management	4 419 000	-	1 237 000	241 000	5 897 000
Sub-Total	13 209 000	-	5 183 000	241 000	18 633 000
2. NUCLEAR APPLICATIONS					
D. Food and Agriculture	8 015 000	1 407 000	8 980 000	4 577 000 c/	22 979 000
E. Human Health	4 458 000	320 000	4 485 000	428 000	9 691 000
F. Industry and Earth Sciences	2 679 000	-	5 692 000	150 000	8 521 000
G. Physical and Chemical Sciences	6 821 000	400 000	9 141 000	13 808 000	30 170 000
Sub-Total	21 973 000	2 127 000	28 298 000	18 963 000	71 361 000
3. NUCLEAR SAFETY AND RADIATION PROTECTION					
H. Radiation Protection	4 240 000	-	3 576 000	320 000	8 136 000
I. Safety of Nuclear Installations	5 235 000	-	2 291 000	246 000	7 772 000
Sub-Total	9 475 000	-	5 867 000	566 000	15 908 000
4. SAFEGUARDS					
J.1. Planning, Direction, Co-ordination, Control and Evaluation	[439 000] d/	-	-	-	[439 000] d/
J.2. Safeguards Operations	26 802 000	-	-	-	26 802 000
J.3. Safeguards Support	25 681 000	-	94 000	3 655 000	29 430 000
Sub-Total	52 483 000	-	94 000	3 655 000	56 232 000
S. DIRECTION AND SUPPORT					
S.1. General Management and Secretariat of the Policy-making Organs	9 121 000	-	-	-	9 121 000
S.2. Administration	11 705 000	-	-	200 000	11 905 000
S.3. Technical Co-operation Servicing and Co-ordination	8 471 000	-	3 673 000 e/	-	12 144 000
S.4. General Services	16 798 000	-	-	-	16 798 000
S.5. Specialized Service Activities	7 614 000	-	119 000	-	7 733 000
S.6. Shared Support Services f/	1 474 000	-	-	-	1 474 000
Sub-Total	55 183 000	-	3 792 000	200 000	59 175 000
Total Agency programmes	152 323 000	2 127 000	43 234 000	23 625 000	221 309 000
Services provided to others	5 217 000	-	-	-	5 217 000
TOTAL	157 540 000	2 127 000	43 234 000	23 625 000	226 526 000
SOURCE OF FUNDS					
Assessment on Member States	148 531 000	-	-	-	148 531 000
Income from work for others	5 217 000	-	-	-	5 217 000
Other miscellaneous income	3 792 000	-	-	-	3 792 000
Other UN organizations	-	2 127 000	4 207 000	-	6 334 000
Technical Assistance and Co-operation Fund	-	-	36 463 000 g/	-	36 463 000
Extrabudgetary Resources	-	-	2 564 000	23 625 000	26 189 000
TOTAL	157 540 000	2 127 000	43 234 000	23 625 000	226 526 000

a/ Funds from FAO, UNDP, UNEP, UNESCO, WHO etc.

b/ TC resources include those foreseen for actual implementation in 1989. Allocations to individual programmes in this table are only indicative, based on extrapolations of past experience and do not prejudice in any way the priorities to be set by Member States.

c/ Includes \$ 900 000 for the upgrading of the training facilities at the Agency's Laboratory at Seibersdorf.

d/ Included in S.1 - General Management and Secretariat of the Policy-making Organs.

e/ Includes \$ 3 500 000 in respect of fellowships which has not been allocated to individual programmes.

f/ Includes only the Library, all other services having been allocated to the user programmes.

g/ Represents the amount expected to be implemented.

TOTAL RESOURCES FOR IMPLEMENTATION IN 1990

Programme Area / Programme	Regular Budget estimates	Funds from other UN organizations a_/	TC resources b_/	Other extra- budgetary resources	TOTAL
1. NUCLEAR POWER AND THE FUEL CYCLE					
A. Nuclear Power	6 782 000	-	2 593 000	-	9 375 000
B. Nuclear Fuel Cycle	2 358 000	-	1 353 000	-	3 711 000
C. Radioactive Waste Management	4 381 000	-	1 237 000	202 000	5 820 000
Sub-Total	13 521 000	-	5 183 000	202 000	18 906 000
2. NUCLEAR APPLICATIONS					
D. Food and Agriculture	8 189 000	1 408 000	8 980 000	3 267 000 c_/	21 844 000
E. Human Health	4 588 000	320 000	4 485 000	170 000	9 563 000
F. Industry and Earth Sciences	2 666 000	-	5 692 000	150 000	8 508 000
G. Physical and Chemical Sciences	7 033 000	400 000	9 141 000	13 515 000	30 089 000
Sub-Total	22 476 000	2 128 000	28 298 000	17 102 000	70 004 000
3. NUCLEAR SAFETY AND RADIATION PROTECTION					
H. Radiation Protection	4 459 000	-	3 576 000	324 000	8 359 000
I. Safety of Nuclear Installations	5 586 000	-	2 291 000	204 000	8 081 000
Sub-Total	10 045 000	-	5 867 000	528 000	16 440 000
4. SAFEGUARDS					
J.1. Planning, Direction, Co-ordination, Control and Evaluation	[312 000] d_/	-	-	-	[312 000] d_/
J.2. Safeguards Operations	30 582 000	-	-	-	30 582 000
J.3. Safeguards Support	26 538 000	-	94 000	3 655 000	30 287 000
Sub-Total	57 120 000	-	94 000	3 655 000	60 869 000
S. DIRECTION AND SUPPORT					
S.1. General Management and Secretariat of the Policy-making Organs	9 363 000	-	-	-	9 363 000
S.2. Administration	12 199 000	-	-	400 000	12 599 000
S.3. Technical Co-operation Servicing and Co-ordination	8 922 000	-	3 673 000 e_/	-	12 595 000
S.4. General Services	17 399 000	-	-	-	17 399 000
S.5. Specialized Service Activities	7 902 000	-	119 000	-	8 021 000
S.6. Shared Support Services f_/	1 542 000	-	-	-	1 542 000
Sub-Total	57 327 000	-	3 792 000	400 000	61 519 000
Total Agency programmes	160 489 000	2 128 000	43 234 000	21 887 000	227 738 000
Services provided to others	5 384 000	-	-	-	5 384 000
TOTAL	165 873 000	2 128 000	43 234 000	21 887 000	233 122 000
SOURCE OF FUNDS					
Assessment on Member States	156 813 000	-	-	-	156 813 000
Income from work for others	5 384 000	-	-	-	5 384 000
Other miscellaneous income	3 676 000	-	-	-	3 676 000
Other UN organizations	-	2 128 000	4 207 000	-	6 335 000
Technical Assistance and Co-operation Fund	-	-	36 857 000 g_/	-	36 857 000
Extrabudgetary Resources	-	-	2 170 000	21 887 000	24 057 000
TOTAL	165 873 000	2 128 000	43 234 000	21 887 000	233 122 000

a_/ Funds from FAO, UNDP, UNEP, UNESCO, WHO etc.

b_/ TC resources include those foreseen for actual implementation in 1990. Allocations to individual programmes in this table are only indicative, based on extrapolations of past experience and do not prejudice in any way the priorities to be set by Member States.

c_/ Includes \$ 400 000 for the upgrading of the training facilities at the Agency's Laboratory at Seibersdorf.

d_/ Included in S.1 - General Management and Secretariat of the Policy-making Organs.

e_/ Includes \$ 3 500 000 in respect of fellowships which has not been allocated to individual programmes.

f_/ Includes only the Library, all other services having been allocated to the user programmes.

g_/ Represents the amount expected to be implemented.

P A R T I

THE PROGRAMME BUDGET

PROGRAMME AREA 1

NUCLEAR POWER AND THE FUEL CYCLE

NUCLEAR POWER AND THE FUEL CYCLE

Summary of total resources by programme

Table 5

Programme	Man-years (Per Year)			Planned expenditure for programme implementation in 1989/1990				
	P	GS	M&O	Regular Budget estimates	Funds from other UN organizations	TC resources	Other extra- budgetary resources	Total
A. Nuclear Power	26.2	18.1	-	13 339 000	-	5 186 000	-	18 525 000
B. Nuclear Fuel Cycle	10.5	6.0	-	4 591 000	-	2 706 000	-	7 297 000
C. Radioactive Waste Management	18.0	21.0	-	8 800 000	-	2 474 000	443 000	11 717 000
Programme Area 1	54.7	45.1	-	26 730 000	-	10 366 000	443 000	37 539 000

PROGRAMME A: NUCLEAR POWER

Area of Activity A.1
Nuclear Power Planning and ImplementationProblem I

Inadequate ability in many developing countries to establish, maintain and develop the planning capability for energy demand and supply that is required for the assessment of alternative energy and electricity supply options, including the assessment and planning of financing requirements and mechanisms (Projects A.1.01 and A.1.08).

Problem II

Many developing countries already involved in or considering a nuclear power programme lack the necessary infrastructure. They need impartial advice and assistance in developing their infrastructure and in executing such a programme (Project A.1.07).

Project A.1.01Nuclear Power Programme Planning

A/1. Objective: To strengthen capabilities for energy and nuclear power planning in developing countries intending to introduce nuclear power in the near or long term and to assist in preparing nuclear power programme plans in developing Member States intending to initiate such programmes in the 1990s.

A/2. Outline of the work planned: A number of technical reports will be prepared on such topics as the assessment of expected trends in nuclear power and the fuel cycle, related economic aspects, energy and nuclear power planning models, and an integrated package approach to planning and decision-making in nuclear power. Country-specific assistance will be provided mainly in the form of TC activities, through which a comprehensive and integrated package of planning assistance will be offered. Depending on the specific situation in individual countries, TC requests may cover either all or specific elements of this package, which will include providing advice on the establishment of organizations for national planning of energy demand and supply strategies. For each requesting country, the scope of a TC project will be defined through detailed preproject planning which will include questionnaires and preparatory missions to assess specific requirements. A group of counterpart experts will be established and trained, and work will be co-ordinated among all national and international organizations involved, in particular the World Bank. In addition, it is planned to initiate, on a trial basis, an advisory service (nuclear power planning advisory team missions) to assist developing countries in carrying out an overall assessment of their level of preparedness to undertake a nuclear power programme. The missions will assess such issues as infrastructure and manpower development, and legal, regulatory, economic and financial aspects, and will give advice on steps to be taken to overcome potential constraints. In the period 1989-90, up to four such missions are envisaged to countries which have clearly stated their intention to initiate a nuclear power programme. The participation of

A. NUCLEAR POWER

the World Bank will be invited. Once experience has been gained with the new service, an evaluation will be made to determine whether it should continue.

A/3. A comprehensive set of planning procedures, including computer programs, guidebooks and manuals, has been largely completed and will require review and updating, including adaptation to microcomputers.

A/4. In providing assistance, regional co-operation and exchange of information and experience in relation to energy and nuclear power planning will be promoted. In particular, workshops for regional users of the Agency's energy planning models (WASP, MAED) will be organized for Asia and the Pacific (RCA), Latin America (ARCAL) and Europe, the Middle East and North Africa.

A/5. One or two interregional, regional or national training courses on planning will be offered each year, providing 30-50 planning staff from 10-20 developing Member States with an average of six weeks training in planning procedures. Two national seminars for decision-makers will be organized each year.

A/6. Expected duration: As this project consists mainly of TC activities, it is of a continuing nature. During the period 1989-90, active assistance will be given to about 10 countries.

Project A.1.07

Support for Nuclear Power Project Implementation

A/7. Objective: To provide support for developing Member States with existing nuclear power projects or planning or launching their first projects in strengthening their national infrastructure and in performing the work required to implement nuclear power projects.

A/8. Outline of the work planned: Work will be performed predominantly through TC projects and will cover three areas: project feasibility studies and infrastructure development planning; manpower development; and project management.

A/9. In the first area, requests are expected in 1989-90 for technical assistance in two-three feasibility studies (about two years is the normal duration of such a study) for nuclear power projects. Feasibility studies for SMPRs of proven types will be carried out if requested. One interregional training course on the introduction of nuclear power is also planned.

A/10. In the second area, support will be given to comprehensive two-three year manpower development projects (financed through Agency TC and UNDP).

A/11. In the third area, assistance will mainly take the form of advice (provided on request) on specific issues such as bid invitations and evaluation and preparing for contract negotiation. One interregional training course and one or two national training courses are planned.

A/12. Expected duration: The project comprises mainly TC activities and is thus of a continuing nature.

Project A.1.08Financial Planning for Nuclear Power Projects

A/13. Objective: To assist in strengthening and supporting government and utility capabilities for financial planning in the electric power sector in order to help improve the circumstances for the financing of nuclear power projects in a country.

A/14. Outline of the work planned: The financing of nuclear power projects involves complex issues which need to be fully understood by all the parties concerned. Experience with conventional and innovative schemes for nuclear power financing (e.g., the build-operate-transfer model, countertrade arrangements) will be studied and the exchange of information on financing schemes will be promoted. A technical report reviewing the principal features of existing or proposed contracting and financing arrangements will be completed in 1990. As the seminar on the costs and financing of nuclear power in developing countries held in 1985 was considered very useful, it is planned to organize a further seminar on this subject in 1990.

A/15. Advisory missions will be undertaken, upon request and jointly with the World Bank, to assist individual developing Member States to evaluate the financial requirements of the electric power sector, including financing needs and the impact of nuclear projects. The Agency's FINPLAN computer model will be adapted and transferred to the country in the course of such assistance. It is expected that about five developing Member States may request Agency TC projects on financial planning during the period 1989-90.

A/16. Expected duration: This is a new project which is expected to continue until 1991-92.

Area of Activity A.2
Nuclear Power Plant Performance

Problem I

All nuclear power plant operators need information on performance achievements in order to set goals for improved or continued high reliability and overall performance and to maintain nuclear power as a viable option (Projects A.2.01 and A.2.02).

Problem II

Many countries, particularly developing ones, operating nuclear power plants face significant challenges in improving plant operating performance (Projects A.2.03, A.2.06 and A.2.07).

A. NUCLEAR POWER

Project A.2.01

Nuclear Power Plant Performance Analysis

A/17. Objective: To provide information on those factors which are important for achieving good technical and economic performance in nuclear power plant construction and operation, through analysis of data on operating experience.

A/18. Outline of the work planned: The main tool is the Agency's Power Reactor Information System (PRIS), which in 1987 contained information on basic performance parameters from more than 3800 reactor years and a short description of more than 25 000 full and partial plant outages (planned and unplanned). PRIS will be used to generate reports, define the scope of meetings and produce special data sets in response to requests.

A/19. It is planned in 1989-90 to:

- Enhance the information collected for PRIS by achieving the participation of all Member States and to obtain more co-operation from them in early transmission of data;
- Improve the analysis of performance data, using other information systems available in the Agency (e.g. INIS, OSART reports, IRS) and to improve the compatibility of these systems. In particular, use of PRIS files for specific outage analysis will provide relevant input to other activities such as the work on plant ageing and life extension;
- Support the Agency's safety programme as needed.

A/20. The results of studies on the construction, operation and fuel costs of nuclear, coal-fired and oil-fired power plants currently being conducted jointly with NEA and the IEA should be available in 1989. These reference data, which will be revised as new data from actual experience become available, will provide information on factors which are important for achieving good economic performance during the construction and operation of nuclear power plants and on measures which will improve the economic viability of nuclear power, particularly in developing countries. The data will also provide a reference cost data base for use in nuclear power planning studies in developing countries.

A/21. Expected duration: The operation of PRIS is a continuing activity.

Project A.2.02

Nuclear Power Plant Ageing and Life Extension

A/22. Objective: To formulate a methodology to evaluate ageing processes affecting plant reliability and thereby assess plant lifetime, to define the inputs for a cost-benefit analysis of life extension programmes and to arrange for an exchange of information on the monitoring and managing of degradation and ageing processes to ensure continued reliability and high overall performance.

A/23. Outline of the work planned: An attempt will be made to define the technical basis for a better understanding of degradation mechanisms so that the residual reliable life of critical components and process systems can be evaluated. This will include reliability assessment and technical aspects of the management of ageing processes and will result in the formulation of special inspection programmes and preventive maintenance and repair measures, and in guidance on the monitoring of operational transients. The outcome of this work will provide necessary inputs for cost-benefit assessments of refurbishment efforts for life extension of ageing power plants. Work will continue on the optimization of reactor pressure vessel surveillance programmes and related methods of analysis for assessing the integrity of critical structural components.

A/24. The above activities will be conducted in co-operation with NEA/OECD and will be co-ordinated with the "Safety of Nuclear Installations" programme.

A/25. Expected duration: The project is expected to continue for about five years. Follow-up activities will consist mainly of updating results and increasing the body of knowledge to facilitate a comprehensive exchange of information at the international level.

Project A.2.03

Quality Programme Management

A/26. Objective: To provide advice and support for improvement of quality programmes as a management tool for all stages of nuclear power projects, especially nuclear power plant operation.

A/27. Outline of the work planned: The main activities planned are as follows:

- Review of practices and exchange of experience in the implementation of the quality requirements of operating nuclear power plants.
- Further development of a methodology for measuring the effectiveness of quality programmes with a view to preparing a manual on this subject in 1991.
- Preparation of practical guidelines to supplement NUSS quality assurance documents. Manuals on the grading of quality assurance activities and on non-conformance and corrective actions will be published during 1989-90.
- Training programmes for management personnel, including regulators, with particular emphasis on presenting QA practices as an integral component of an effective management system. Interregional, regional and national training courses or seminars will be conducted under the TC programme. A regional seminar is planned for 1990.
- Assisting the establishment in individual developing Member States of training centres for the qualification of QA/QC personnel involved in nuclear power projects and in industry. At present, the Agency is assisting up to 10 developing Member States in

A. NUCLEAR POWER

setting up a training programme for QA/QC personnel. Through these efforts, a systematic approach is offered to the problem of building up qualified manpower to implement quality programmes in nuclear power plants. An integrated package approach will be developed which will be readily applicable to specific countries with only minor adjustments to take account of the conditions in and requirements of the individual requesting Member State. Three-five advisory missions and two-three national training courses are planned.

A/28. Expected duration: The TC aspects of this project are continuing in nature.

Project A.2.06

Qualification Standards for Nuclear Power Plant Operating Personnel

A/29. Objective: To review requirements of and criteria for qualification standards for nuclear power plant operating personnel and to appraise related training programmes.

A/30. Outline of the work planned: Information on the qualification requirements and operator licensing procedures adopted by experienced operating organizations will be systematically analysed with the aim of providing comprehensive guidance for qualification standards. The adequacy of training programmes in Member States, and particularly their simulator training components, will be appraised. Procedures for the accreditation of operator training programmes will be assessed with the aim of exploring the feasibility of the international accreditation of such programmes. Assistance will be provided to Member States through TC projects.

A/31. The guidebook on qualification of nuclear power plant operations personnel published in 1984 will be reviewed and updated in the light of the most recent developments.

A/32. Expected duration: This is a new project which will end in 1991. TC aspects will continue.

Project A.2.07

Man-Machine Interface Studies

A/33. Objective: To provide systematic information on the man-machine interface and closely related issues with a view to drawing up guidelines for improved control room designs.

A/34. Outline of the work planned: A major international conference on the man-machine interface in the nuclear industry was held in 1988. During the period 1989-90 human factors in the man-machine interface which are of relevance to the improvement and evaluation of man-machine systems will be analysed. Information will be collected on the adequacy of operator computer aids and on human reliability in order to draw up guidance on the optimum level of automation versus manual functions. These activities will be

co-ordinated with complementary activities under the "Safety of Nuclear Installations" programme and will result in the formulation of guidelines on control room design in 1991. Activities in important problem areas such as improvement of operator computer aids, new control and instrumentation concepts and instrumentation techniques will continue until 1992.

A/35. Expected duration: This is a new project which will terminate in 1992.

Area of Activity A.3
Nuclear Power Systems Technologies

Problem I

Further progress in the areas of thermal reactor technology, improved reactor concepts, nuclear heat applications and fusion research and engineering will require effective international exchange of information and encouragement of further international co-operation. There is also a need to make information on progress in these areas generally available to interested Member States (Projects A.3.01, A.3.02, A.3.03, A.3.05 and A.3.06).

Project A.3.01

Improvement of Reactor Technologies

A/36. Objective: To promote international co-operation in the development of reactor systems and to provide guidance to developing countries initiating programmes in this field.

A/37. Outline of the work planned: Information on sodium-cooled reactor technology development will be exchanged through the International Working Group on Fast Reactors (IWGFR). In past years reviews have covered the areas of sodium technology, operational experience, reliability of critical equipment, fuel behaviour and safety-related aspects. The present trend is increasingly towards simplifying designs and extending the life of fuel in order to achieve vital cost reductions together with enhanced safety.

A/38. With regard to water-cooled high converters (LWR, HWR), the focus in 1989-90 will be on the assessment of the technico-economic potential of these concepts. This work will be performed mainly by the International Working Group on Advanced Technologies for Water-Cooled Reactors (IWGATWR).

A/39. Expected duration: This project involves only information exchange and as such is of a continuing nature.

Project A.3.02

Evolution of Current Power Reactor Technology

A/40. Objective: To provide a forum for the exchange of information on improvements in the current generation of water-cooled power reactors, on the evolution of their design and on new design concepts for near-term application, with emphasis on reliability and safety.

A. NUCLEAR POWER

A/41. Outline of the work planned: In the area of nuclear power reactor technology development, the trend in Member States is towards the rationalization and improvement of the performance, reliability and economics of existing technologies (including SMPRs) rather than on the creation of an entirely new generation of reactors. Safety considerations will continue to play a vital role in this development. The Agency's work will take the form mainly of information exchange, the principal forum for which will be the IWGATWR. In 1989-90, reviews will be made of technology development relating to accident mitigation and passive safety.

A/42. Within this framework, specialists' meetings and CRPs will be organized in order to improve the understanding of neutron physics and thermal hydraulics in reactor cores under normal and accident situations.

A/43. Expected duration: The information exchange activities are of a continuing nature.

Project A.3.03

Nuclear Heat Applications

A/44. Objective: To provide a forum for information exchange on, and to encourage international co-operation for, technology development of reactor systems with the potential to provide, besides electricity, process heat and steam for various industrial and other applications.

A/45. Outline of the work planned: High temperature gas-cooled reactors are expected to have specific advantages not only in thermal efficiency but also in safety. The Agency's activities involve principally the exchange of information, and in 1989-90 will focus on the development of small and modular gas-cooled reactors with various process steam applications in cogeneration with electricity (in the field of enhanced oil recovery, for example), such applications being of growing importance also in Member States with less developed infrastructures.

A/46. With regard to low-temperature nuclear heat applications, a comprehensive programme of review was completed in 1987 with the publication of technical documents on the potential of such applications and on design, operational and safety aspects of nuclear power plants for district heating. In the period 1989-90, assistance will be provided - through TC - to requesting Member States.

A/47. Expected duration: This project involves mainly information exchange and is thus continuing in nature.

Project A.3.05

Fusion Research and Engineering

A/48. Objective: To facilitate the worldwide exchange of information on the technological and scientific data accumulated in this field, to contribute to the extensive efforts required to demonstrate the feasibility of this long-term energy source and to assist Member States in fusion research, including plasma physics.

A/49. Outline of the work planned: The activities of this project are continuously reviewed by the International Fusion Research Council (IFRC), which assists the Agency in identifying key areas for research on the physics and technology needed to further fusion development. In the period 1989-90, technical documents will be prepared on blanket concepts and materials for plasma-facing components, and it is planned to initiate a CRP on lifetime predictions for the first wall. In addition, technical documents will be issued on safety, radiation protection and nuclear data aspects of future fusion power systems (in co-operation with the "Radiation Protection" and "Physical and Chemical Sciences" programmes).

A/50. In the plasma physics research and fusion engineering areas, reports will be prepared on aspects which complement ITER (International Thermonuclear Experimental Reactor) activities. A conference on plasma physics and controlled nuclear fusion research will be organized in 1990. The publication of the journal "Nuclear Fusion" will continue to be a major activity.

A/51. Expected duration: Continuing.

Project A.3.06

International Thermonuclear Experimental Reactor (ITER)

A/52. Objective: To provide a single conceptual design for the next-step tokamak fusion reactor experiment capable of being used by any ITER partner as the basis for the engineering design and construction of the machine.

A/53. Following the conclusion of the International Tokamak Reactor (INTOR) project in 1987, the participants in that project (European Community, Japan, USA and the USSR) have agreed to co-operate on a conceptual design study (ITER) of the next-step tokamak experiment, which will be carried out by them under the auspices of the Agency. The technical work of the project will be performed by national research and development establishments in participating States, with the necessary co-ordination and management work being carried out by joint bodies established for this purpose. The Agency's contribution to the project will be of the same type and scope as in the case of INTOR. In the event that additional effort is required on the part of the Agency, all the relevant costs will be reimbursed to it by the participating countries. The project will start in 1988 and will take three years to complete.

A/54. Expected duration: Three years.

PROGRAMME A: NUCLEAR POWER

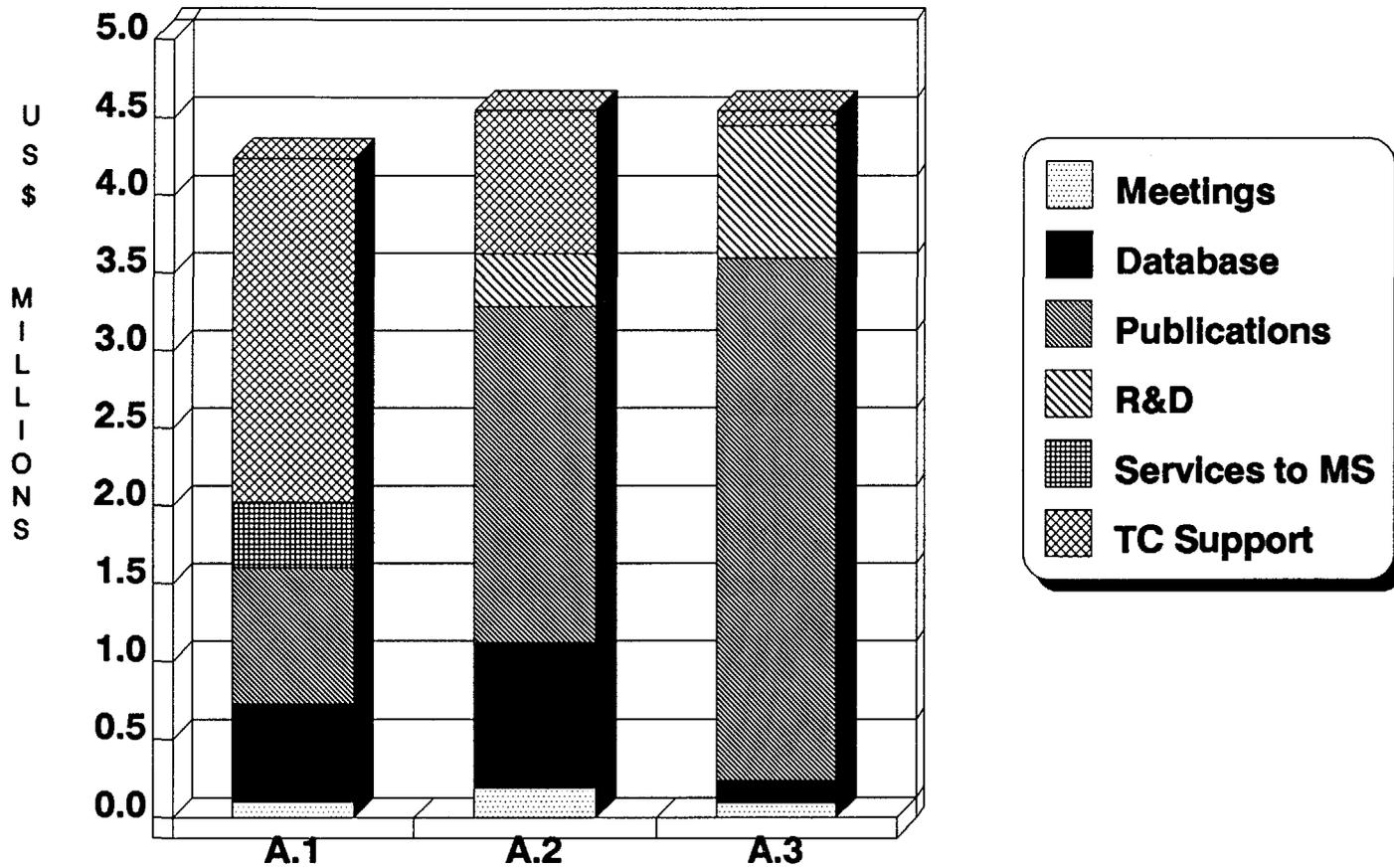
Summary of main means by Area of Activity for 1989/1990Table 6

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O										
A.1. Nuclear Power Planning and Implementation	NENP	9.4	5.8	-	107 000	624 000	872 000	-	-	-	422 000	2 216 000	-	4 241 000
A.2. Nuclear Power Plant Performance	NENP	9.4	4.8	-	192 000	930 000	2 161 000	-	-	344 000	-	923 000	-	4 550 000
A.3. Nuclear Power Systems Techno- logies	NENP	4.2	2.4	-	-	-	1 185 000	-	-	665 000	-	93 000	-	1 943 000
	RIPC	2.2	1.1	-	97 000	-	600 000	-	-	190 000	-	-	-	887 000
	NESI	1.0	4.0	-	-	143 000	1 575 000	-	-	-	-	-	-	1 718 000
Programme A Total		26.2	18.1	-	396 000	1 697 000	6 393 000	-	-	1 199 000	422 000	3 232 000	-	13 339 000

A. Nuclear Power

Main Means by Area of Activity

Graph 1



PROGRAMME A: NUCLEAR POWER

Summary of Regular Budget estimates by Area of ActivityTable 7

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure increase(decr.) %		1989 at 1988 prices	Expenditure increase(decr.) %		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
A.1. Nuclear Power Planning and Implementation	NENP	2 112 000	(140 000)	(6.6)	1 972 000	73 000	3.7	2 045 000	3.7	2 044 000	3.6	2 197 000
A.2. Nuclear Power Plant Performance	NENP	1 811 000	390 000	21.5	2 201 000	(91 000)	(4.1)	2 110 000	3.7	2 282 000	3.6	2 268 000
A.3. Nuclear Power Systems Technologies	NENP	1 150 000	(235 000)	(20.4)	915 000	10 000	1.1	925 000	3.7	949 000	3.6	994 000
	RIPC	408 000	11 000	2.7	419 000	(8 000)	(1.9)	411 000	4.7	439 000	4.0	448 000
	NESI	790 000	(4 000)	(0.5)	786 000	-	-	786 000	7.3	843 000	3.7	875 000
Total - Programme A		6 271 000	22 000	0.4	6 293 000	(16 000)	(0.3)	6 277 000	4.2	6 557 000	3.7	6 782 000

Programme A: List of projects and estimated total resources for 1989/1990Table 8

Area of Project Activity Code	Estimated Resources for 1989/1990			
	Regular Budget	Extra- Budgetary	TC	Total
A.1. Nuclear Power Planning and Implementation				
A.1.01 Nuclear Power Programme Planning	2 524 000			
A.1.07 Support for Nuclear Power Project Implementation	1 270 000			
A.1.08 Financial Planning for Nuclear Power Projects	447 000			
Sub-total	4 241 000	-	3 348 000	7 589 000
A.2. Nuclear Power Plant Performance				
A.2.01 Nuclear Power Plant Performance Analysis	1 579 000			
A.2.02 NPP Ageing and Life Extension	689 000			
A.2.03 Quality Programme Management	994 000			
A.2.06 Qualification Standards for Nuclear Power Plant Operating Personnel	733 000			
A.2.07 Man-Machine Interface Studies	555 000			
Sub-total	4 550 000	-	1 598 000	6 148 000
A.3. Nuclear Power Systems Technologies				
A.3.01 Improvement of Reactor Technologies	587 000			
A.3.02 Evolution of Current Power Reactor Technology	1 024 000			
A.3.03 Nuclear Heat Applications	189 000			
A.3.05 Fusion Research and Engineering				
(NENP)	143 000			
(RIPC)	733 000			
(NESI)	1 718 000			
A.3.06 International Thermonuclear Experimental Reactor				
(RIPC)	154 000			
Sub-total	4 548 000	-	240 000	4 788 000
Total: Programme A - Nuclear Power	13 339 000	-	5 186 000	18 525 000

B. NUCLEAR FUEL CYCLE

PROGRAMME B: NUCLEAR FUEL CYCLE

Area of Activity B.1 Resources of Nuclear Raw Material

Problem I

A comprehensive world picture of nuclear fuel resources is required as a basis for long-term planning of the development of nuclear power and fuel cycle strategies. Assessments of nuclear fuel resources based on geology and exploration are inadequate in many countries, particularly developing countries (Project B.1.01).

Problem II

Exploration and mining technology and techniques in many countries need to be improved as regards efficiency, economics and environmental protection (Project B.1.02).

Problem III

Many developing countries have inadequate trained manpower resources and infrastructures for uranium exploration, economic assessment and resource development and depend on Agency assistance (Project B.1.03).

Project B.1.01

Data on Nuclear Raw Material Resources, Supply and Demand

B/1. Objective: To maintain and improve the quality and coverage of estimates of world nuclear fuel resources, supply and demand, and to make information available in a regular and timely manner.

B/2. Outline of the work planned: The biennial assessment of world uranium resources, production and demand will be continued and a joint report will be published with NEA (the next edition will appear in 1989). Uranium supply and demand analyses will be carried out periodically in co-operation with NEA.

B/3. Expected duration: Continuing.

Project B.1.02

Nuclear Raw Material Geology, Exploration and Mining

B/4. Objective: To gather, exchange and report current information on technology and developments in nuclear raw material geology, resource appraisal, exploration, evaluation and production.

B/5. Outline of the work planned: Work will concentrate on three areas: world uranium geology; exploration and evaluation of uranium deposits; and the wider use of uranium exploration data and technology.

B/6. Activities concerning world uranium geology were initiated in the late 1970s with the aim of producing comprehensive documents on the characteristics and recognition criteria of the world's uranium deposits. The publication of this series of regional assessments will be completed by 1991. Operation of the International Uranium Geology Information System (INTURGEO) will continue.

B/7. On the basis of previous reviews and publications relating to the exploration and evaluation of uranium deposits, a set of manuals and guide books will be produced by 1991 on uranium mineralogy, on feasibility studies for and the economic analysis of mining projects, and on uranium exploration, planning and practice. Reference materials will be prepared with the help of the Agency's Laboratory and made available to analytical laboratories in Member States. The Uranium Newsletter first published in 1987 will be issued annually.

B/8. With regard to the wider use of uranium exploration data and technology, it is planned in co-operation with UNESCO and the International Union of Geological Sciences (IUGS) to prepare a technical report in 1990 on uranium geochemical and radioelement maps of the world. This will include guidance on the use of exploration data to define the natural radiation environment and on procedures for the acquisition of new airborne radiometric data in the event of nuclear emergencies.

B/9. In general, the emphasis of this project has been shifted from resource evaluation to uranium geology aspects; the uranium deposit models and recognition criteria that have been developed will serve as the basis for assessments of new exploration areas.

B/10. Expected duration: As the project involves information exchange, it is continuing in nature, although many individual activities will be concluded within the period 1989-90, as indicated above.

Project B.1.03

Assistance in Nuclear Raw Material Resources Assessment and Development

B/11. Objective: To assist Member States to develop and strengthen their ability to carry out nuclear raw material resource assessment, exploration, development and production activities.

B/12. Outline of the work planned: Support will be provided to 25-30 TC projects during the period. Encouragement will be given to broad-scale regional resource evaluation surveys rather than to detailed exploration projects, except in special cases. A training course on uranium exploration and development is planned for 1990. Manuals and guidebooks will also be prepared, the main objective of which will be to support TC activities.

B/13. Expected duration: This project consists of TC activities and is thus of a continuing nature.

Area of Activity B.2
Processing of Nuclear and Reactor Materials

Problem I

The infrastructure for the production of nuclear fuel and reactor materials is inadequate in many developing countries. Also, there is a lack of adequate information on the technology, economics and safety of the processing and production of uranium and reactor materials (Projects B.2.01 and B.2.02).

Project B.2.01

Nuclear and Reactor Materials Processing and Production

B/14. Objective: To collect, evaluate, collate and disseminate current information on uranium extraction technology and on the establishment of projects for the production of uranium concentrates and other nuclear and reactor materials, and to prepare, maintain and make available a current and reliable directory of nuclear fuel cycle facilities throughout the world.

B/15. Outline of the work planned: As a result of information exchange activities in 1989-90, technical reports will be prepared on uranium extraction technology, on uranium refining and conversion and the production of uranium dioxide powders and pellets, on the effects of new enrichment technologies on the demand for uranium hexafluoride and uranium metal, and on the economic analysis of the production of uranium concentrates.

B/16. With regard to safety aspects, a technical document on the safety aspects of the production of uranium hexafluoride will be published in 1991. The co-operation of relevant international organizations will be invited.

B/17. Updated editions of a directory of nuclear fuel cycle facilities will be published on the basis of the Nuclear Fuel Cycle Information System (NFCIS), which is a computerized data base.

B/18. Expected duration: The project deals with information exchange and is of a continuing nature.

Project B.2.02

Guidance on Nuclear and Reactor Materials Processing and Production

B/19. Objective: To provide assistance to developing countries in the planning and implementation of nuclear fuel cycle activities and in the production of uranium concentrates and nuclear and reactor materials.

B/20. Outline of the work planned: Assistance to specific developing countries will be provided under the TC programme and will include a training course. In support of training activities, a guidebook on planning nuclear fuel cycle facilities in developing countries will be prepared in 1990.

B/21. Expected duration: Continuing.

Area of Activity B.3
Reactor Fuel Design, Fabrication and Performance

Problem I

Studies relating to selected aspects of reactor fuel design, fabrication and improved performance require support through information exchange and co-ordination (Project B.3.01).

Project B.3.01

Design, Quality and Performance of Reactor Fuel

B/22. Objective: To serve as a forum for the exchange of information on nuclear fuel properties, design, fabrication and utilization in order to improve both the economics and reliability of fuel operation.

B/23. Outline of the work planned: The project deals with three areas: improved materials reliability; improved fuel utilization and plant performance; and improved fuel fabrication. Close co-operation will be maintained with the "Nuclear Power" programme in the first two areas.

B/24. Although the current situation with respect to the first area is satisfactory, the reliability and safety of fuel materials will in the future have to take into account the more severe conditions for fuel behaviour that result from the demand for increased fuel effectiveness (extension of operating limits and flexibility margins) and improved economy. In this connection, technical documents will be produced by 1991 on such topics as the properties of core materials and fission product release under accident conditions, and the technical and safety aspects of fuel design, performance and utilization in advanced water-cooled reactors. Also, a CRP will be conducted on fission gas release under power ramping, load follow and accident conditions (1989-91).

B/25. In the second area, work is being done in Member States on higher burnup and extended lifetime for fuel. In this connection, five technical publications will be prepared between 1988 and 1992 and three CRPs will be organized in the period up to 1993. The publications will relate to such issues as coolant- and pellet-cladding interaction, post-irradiation examination techniques, advanced fuel technology and performance, and water chemistry. The CRPs will deal with water chemistry control, examination and documentation methodology for water reactor fuel, and the use of gadolinium in water reactor fuel.

B/26. In the field of improved fabrication, the main emphasis will be on aspects of fuel quality assurance and quality control. A guidebook on destructive examination of reactor fuel will be issued in 1991. Together with a training course on QC and QA of nuclear fuel, the objective of this publication will be primarily to support TC activities in this sphere. A seminar on QA and QC in the design and manufacture of water reactor fuel is planned for 1990.

B. NUCLEAR FUEL CYCLE

B/27. It is expected that support will be given to some 10-20 TC projects.

B/28. Expected duration: The TC aspects of this project are continuing in nature.

Area of Activity B.4 Spent Fuel Management

Problem I

The management of increasing amounts of spent fuel is posing difficulties in many countries (Projects B.4.01, B.4.02 and B.4.03).

Project B.4.01

Spent Nuclear Fuel Arisings and Capacity Requirements

B/29. Objective: To collect, evaluate, analyse and disseminate information on spent fuel requirements and fuel discharges world wide.

B/30. Outline of the work planned: As part of activities concerning the collection, evaluation and dissemination of information, a technical document on spent nuclear fuel arisings and capacity requirements will be prepared in 1990. Strategies, options and trends in spent fuel management will be reviewed and a technical document on the subject published in 1991. A glossary of spent fuel storage terms issued in 1985 will be updated and published in a multilingual edition in 1990.

B/31. Expected duration: Information collection on this subject is a continuing activity.

Project B.4.02

Spent Fuel Storage Options and Practices

B/32. Objective: To serve as a forum for the exchange of new experimental, theoretical and operational information on spent fuel storage with emphasis on safety, engineering and economic aspects, and to assist developing countries in choosing optimal solutions to spent fuel storage problems, taking into account the particular conditions prevailing in individual countries.

B/33. Outline of the work planned: Project activities are broadly divided into, first, the review of the technical and economic aspects of fuel storage and transportation and, secondly, safety-related aspects of spent fuel storage.

B/34. In the first area, a number of studies will be performed in which current spent fuel storage practices and the latest research and development work on advanced concepts will be reviewed. Several technical documents will be issued between 1988 and 1992 on such topics as the economics of spent fuel

storage and dry storage and rod consolidation experience. Also, research will be promoted through CRPs on the behaviour of spent fuel assemblies and storage equipment under long-term storage conditions (1987-91) and on the behaviour of structural materials under irradiation with emphasis on heterogeneous processes (1988-92).

B/35. As regards safety-related aspects, a technical report on the main principles of the management of severely damaged nuclear fuel will be drawn up in 1990. This will serve as the basis for the preparation in 1991 of a safety guide on the same subject. A seminar on safety and other aspects of spent fuel storage is planned for 1990.

B/36. A training course on spent fuel storage is planned for 1990 and support will be provided to 5-10 TC projects.

B/37. Expected duration: The project involves both information exchange and TC activities and is continuing in nature.

Project B.4.03

Spent Fuel Treatment and Recycling

B/38. Objective: To collect, evaluate, compile and exchange information on the status of methodologies for spent fuel treatment and remote control technology.

B/39. Outline of the work planned: In the period 1989-90, information will be exchanged and reports published on the economics of the different options for the back end of the nuclear fuel cycle, on environmental safety aspects of the storage and transportation of fissile materials, and on remote control technologies. Also, a technical report will be prepared in 1990 on the feasibility of the separation of non-fissile materials from high-level waste.

B/40. Expected duration: This project involves information exchange and is continuing in nature.

PROGRAMME B: NUCLEAR FUEL CYCLE

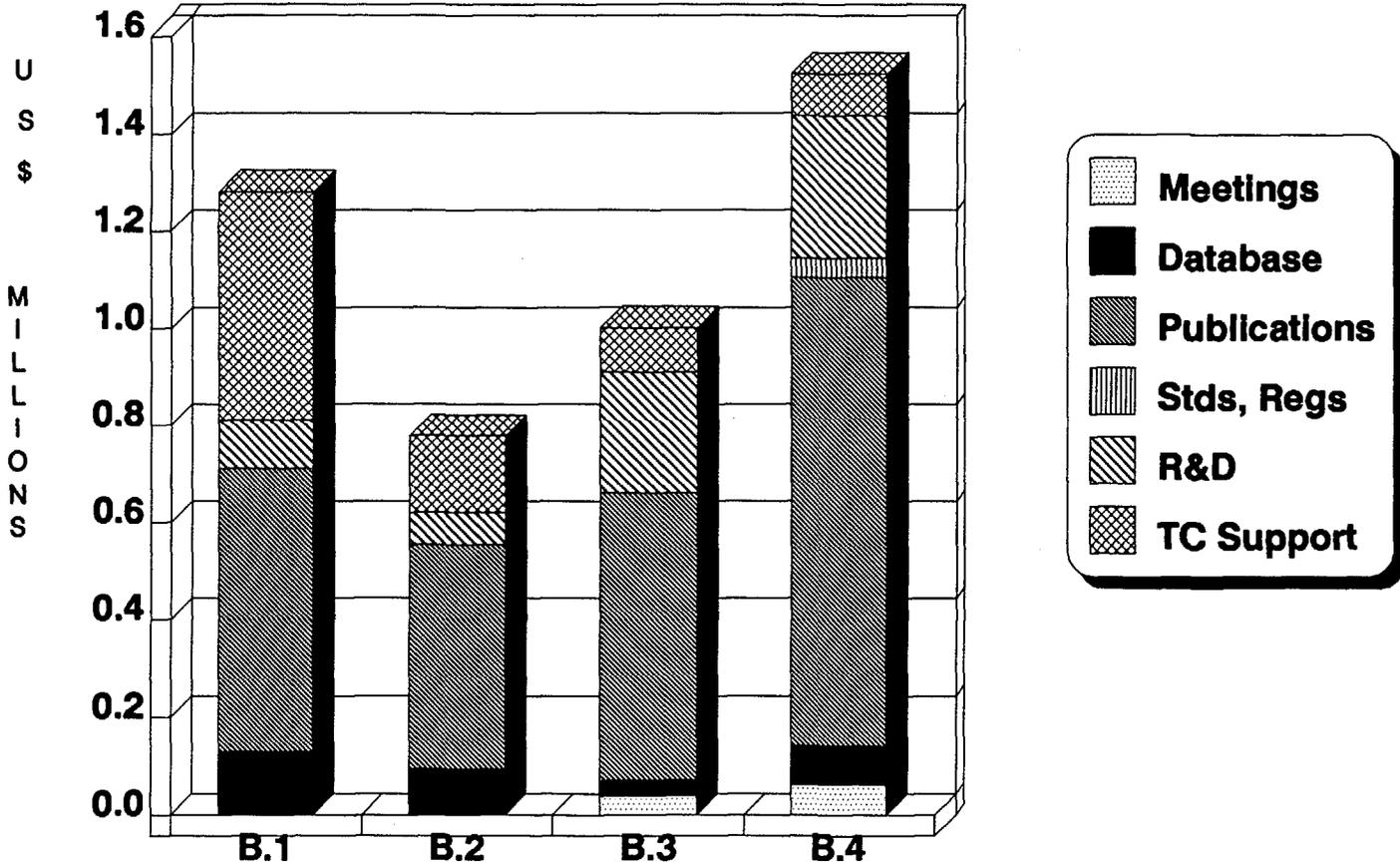
Summary of main means by Area of Activity for 1989/1990Table 9

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O										
B.1. Resources of Nuclear Raw Material	NENF	3.5	2.0	-	-	131 000	580 000	-	-	101 000	-	471 000	-	1 283 000
B.2. Processing of Nuclear and Reactor Materials	NENF	2.0	1.0	-	-	95 000	459 000	-	-	67 000	-	158 000	-	779 000
B.3. Reactor Fuel Design, Fabrication and Performance	NENF	2.0	1.0	-	41 000	32 000	588 000	-	-	250 000	-	92 000	-	1 003 000
B.4. Spent Fuel Management	NENF	3.0	2.0	-	63 000	80 000	964 000	-	40 000	293 000	-	86 000	-	1 526 000
Programme B Total		10.5	6.0	-	104 000	338 000	2 591 000	-	40 000	711 000	-	807 000	-	4 591 000

B. Nuclear Fuel Cycle

Main Means by Area of Activity

Graph 2



PROGRAMME B: NUCLEAR FUEL CYCLE

Summary of Regular Budget estimates by Area of ActivityTable 10

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure increase(decr.) %		1989 at 1988 prices	Expenditure increase(decr.) %		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
B.1. Resources of Nuclear Raw Material	NENF	608 000	6 000	1.0	614 000	(13 000)	(2.1)	601 000	3.7	637 000	3.5	646 000
B.2. Processing of Nuclear and Reactor Materials	NENF	351 000	20 000	5.7	371 000	(4 000)	(1.1)	367 000	3.7	384 000	3.5	395 000
B.3. Reactor Fuel Design, Fabrication and Performance	NENF	518 000	(62 000)	(12.0)	456 000	37 000	8.1	493 000	3.7	473 000	3.5	530 000
B.4. Spent Fuel Management	NENF	741 000	(28 000)	(3.8)	713 000	20 000	2.8	733 000	3.7	739 000	3.5	787 000
Total - Programme B		2 218 000	(64 000)	(2.9)	2 154 000	40 000	1.9	2 194 000	3.7	2 233 000	3.5	2 358 000

Programme B: List of projects and estimated total resources for 1989/1990Table 11

Area of Activity	Project Code	Estimated Resources for 1989/1990			
		Regular Budget	Extra- Budgetary	TC	Total
B.1.	Resources of Nuclear Raw Material				
	B.1.01 Data on Nuclear Raw Material Resources, Supply and Demand	173 000			
	B.1.02 Nuclear Raw Material Geology, Exploration and Mining	459 000			
	B.1.03 Assistance in Nuclear Raw Material Resources Assessment and Development	651 000			
	Sub-total	1 283 000	-	2 288 000	3 571 000
B.2.	Processing of Nuclear and Reactor Materials				
	B.2.01 Nuclear and Reactor Materials Processing and Production	483 000			
	B.2.02 Guidance on Nuclear and Reactor Materials Processing and Production	296 000			
	Sub-total	779 000	-	136 000	915 000
B.3.	Reactor Fuel Design, Fabrication and Performance				
	B.3.01 Design, Quality and Performance of Reactor Fuel	1 003 000			
	Sub-total	1 003 000	-	238 000	1 241 000
B.4.	Spent Fuel Management				
	B.4.01 Spent Nuclear Fuel Arisings and Capacity Requirements	216 000			
	B.4.02 Spent Fuel Storage Options and Practices	815 000			
	B.4.03 Spent Fuel Treatment and Recycling	495 000			
	Sub-total	1 526 000	-	44 000	1 570 000
	Total: Programme B - Nuclear Fuel Cycle	4 591 000	-	2 706 000	7 297 000

C. RADIOACTIVE WASTE MANAGEMENT

PROGRAMME C: RADIOACTIVE WASTE MANAGEMENT

Area of Activity C.1

Handling, Treatment, Conditioning and Storage of Radioactive Waste

Problem I

A more effective international exchange of technological information and the development of standards and criteria are required for the processing and storage of high-level, alpha-bearing and other reactor and fuel cycle wastes in Member States (Projects C.1.01 and C.1.02).

Problem II

In many developing countries there is virtually no appreciation of the concepts (technology, safety and regulations) appropriate for the processing and storage of waste from nuclear applications and the necessary organizational infrastructure is often lacking (Project C.1.03).

Project C.1.01

Processing and Storage of High-Level and Alpha-Bearing Wastes

C/1. Objective: To provide a forum for the exchange of technical information on processing and storage technologies for high-level and alpha-bearing wastes from reprocessing plants and conditioned spent fuel, and to promote the evaluation of conditioned high-level waste forms under repository conditions.

C/2. Outline of the work planned: Work will be divided into three areas: assessment of technology for alpha-bearing and high-level waste; assessment and technical evaluation of conditioned spent fuel as a final waste form; and safety standards, guidelines and quality control for final waste packages.

C/3. In the first area, a CRP on the performance of solidified high-level waste forms and engineered barriers under repository conditions will be completed in 1989. A technical report on the design and operation of high-level waste vitrification and storage facilities will be prepared in 1990.

C/4. As regards the second topic, a technical report reviewing all technical, economic and safety factors which should be taken into account in evaluating concepts of conditioned spent fuel as a final waste form will be drawn up in 1990. A further technical report will be prepared (in 1991) on technical concepts for the conditioning of spent fuel for final waste disposal.

C/5. In the third area, a technical report on quality assurance and quality control concepts for the production of solidified high-level waste forms and packages will be prepared in the period 1990-92.

C/6. Expected duration: Continuing.

Project C.1.02

Processing and Storage of Waste from Nuclear Power Plants
and Nuclear Fuel Cycle Facilities

C/7. Objective: To encourage research activities on the processing and storage of low- and intermediate-level waste from nuclear power plant and fuel cycle facilities and to facilitate the exchange of information on technology and engineering development.

C/8. Outline of the work planned: Work will concentrate on three areas: first, the review of the status of and trends in selected technical aspects of waste generated under normal conditions; secondly, the identification of technical aspects of waste generated under normal conditions deserving further research and development, and the promotion of research in these areas; and thirdly, technical reviews and the encouragement of research on waste generated under abnormal and accident conditions.

C/9. In the first area, technical reports will be drawn up on the retention, conditioning and disposal of carbon-14 (1992) and on volume reduction technologies for low- and intermediate-level wastes (1990).

C/10. In the second field, research will be promoted (until 1990) with the aim of evaluating low- and intermediate-level radioactive solid waste forms and packages and (until 1992) on the use of inorganic sorbents for liquid waste treatment and backfill for underground repositories.

C/11. With regard to the third area, a technical report will be prepared on the handling and retention of airborne radionuclides at nuclear power plants under abnormal conditions (1990). In addition, a safety guide on the handling of radioactive waste generated during unplanned events or accident situations will be issued in 1991.

C/12. Expected duration: Continuing.

Project C.1.03

Processing and Storage of Waste from Nuclear Applications

C/13. Objective: To assist developing countries in establishing and implementing national waste management programmes, with particular emphasis on the problems of sealed radiation source management.

C/14. Outline of the work planned: Certain activities planned under this project were conducted under other parts of the programme (Projects C.1.02 and C.2.09) in 1987-88 and are now being integrated into one project dealing with wastes generated from radioisotope and radiation applications and from nuclear research establishments in countries not engaged in nuclear power or fuel cycle activities. It is intended to intensify the Agency's activities in this area.

C/15. The work falls into two categories, the first being technical reviews of and the encouragement of research on selected topics, and the second being direct assistance to Member States in developing national waste management programmes and regulatory systems.

C. RADIOACTIVE WASTE MANAGEMENT

C/16. In the first area, technical reports on the chemical treatment of low- and intermediate-level radioactive waste and on the packaging of such wastes will be published in 1990 and 1991, respectively. Also, a CRP on treatment technologies for special low- and intermediate-level wastes generated from institutional sources will be initiated in 1990, continuing until 1994.

C/17. In the second area, in order to ensure that the various steps involved in setting up a national waste management programme in developing Member States are taken in a safe, efficient and integrated manner, Waste Management Advisory Programme (WAMAP) missions will be sent to assist in formulating such concepts and programmes and the associated regulatory framework. Specific TC projects concerning the implementation of individual parts of such programmes will be organized when requested. In support of this work and to facilitate national design and investment processes, a standard design for waste processing and storage facilities will be developed by 1990. A technical document will be issued in 1990 on treatment technologies and options for processing waste generated by isotope users and on the handling, conditioning and disposal of spent radiation sources. In addition, a training course for senior officials with responsibility for waste management at the national level and for the corresponding regulatory personnel will be developed and subsequently organized on a regional basis.

C/18. The above design for waste processing and storage facilities may be capable of treating and disposing of old radium sources if certain modifications are made to the facility. Consideration is also being given to possible arrangements whereby countries operating suitable facilities (for example, suppliers of sources) would agree to take spent sources back for conditioning and disposal.

C/19. Expected duration: This project consists mainly of TC and related activities and is thus continuing in nature.

Area of Activity C.2 Radioactive Waste Disposal

Problem I

The safety of proposed methods of waste disposal has still to be fully demonstrated and accepted (Project C.2.01).

Problem II

The absence of internationally agreed standards and criteria for safe waste disposal is an obstacle to the development and execution of national waste disposal plans (Projects C.2.02 and C.2.03).

Problem III

Many developing countries lack adequate capability to assess the environmental impact of waste disposal (C.2.07).

Problem IV

The capability to monitor marine radioactivity is largely restricted to developed countries and needs to be widened. Marine radiochemical, radiological and geochemical techniques require substantial improvement (Projects C.2.05 and C.2.06).

Project C.2.01Research and Technical Aspects of Waste Disposal

C/20. Objective: To encourage and facilitate research activities concerning underground radioactive waste disposal and to develop technological and engineering guidance in this area.

C/21. Outline of the work planned: During the period 1977-86, a series of technical publications was produced containing technological, engineering and safety guidance on the underground disposal of low- and intermediate-level waste into shallow land and rock cavities. A second phase is now planned for the period 1988-97, the proposed activities including the exchange of information on technology and engineering development (C.2.01) and the formulation of safety regulations for high-level waste (C.2.02).

C/22. A technical document will be prepared in 1990 reviewing the state of the art of the underground disposal of radioactive waste. Two safety guides on the siting, design and construction and on the operation, shutdown and closing of deep geological repositories will also be drawn up. With regard to chemically hazardous radioactive waste, a technical report will be issued in 1990 on the latest developments in the disposal of such waste. As an input to the safety assessment of underground disposal, research will be co-ordinated on the geochemistry of long-lived transuranic actinides and fission products (1986-1991) and on the migration and biological transfer of radionuclides from shallow land burial of radioactive wastes (until 1989).

C/23. In addition, three reports will be prepared by 1991 on various aspects of post-accident entombment technologies for nuclear facilities, including near-field effects, safety and performance assessment, and the optimization of post-accident sealing technology.

C/24. Support will be provided to TC projects upon request.

C/25. The Waste Management Research Abstracts will be published annually.

C/26. Expected duration: Information exchange under this project is of a continuing nature.

Project C.2.02Regulatory Aspects of Waste Disposal

C/27. Objective: To develop internationally agreed guidelines to assist Member States in establishing national standards, criteria and regulations for the safe disposal of radioactive wastes.

C. RADIOACTIVE WASTE MANAGEMENT

C/28. Outline of the work planned: As part of the 10 year programme referred to in Project C.2.01, efforts were made to establish a complete regulatory framework for underground waste disposal. From 1990 to 1993, four safety standards documents and guides will be drawn up, dealing with shallow ground, rock cavities and deep geological formations.

C/29. In 1990 the Agency's Definition and Recommendations on radioactive matters established in connection with London Dumping Convention will be reviewed in the light of developments and of the Agency's work in this field since 1985.

C/30. Expected duration: Ten years.

Project C.2.03

Exemption of Radiation Sources from Regulatory Control

C/31. Objective: To establish internationally agreed principles for exempting trivial sources of ionizing radiation from regulatory requirements and to provide guidance on the practical application of these principles in such important areas of waste management as low-level waste disposal in the terrestrial and marine environments, the decommissioning of nuclear sites and the re-use of slightly contaminated materials.

C/32. Outline of the work planned: The project, which was originally scheduled for completion in 1989, has been delayed by problems encountered in obtaining international consensus on principles for exemption. Assuming that such a consensus is achieved in 1988, the project should be completed in 1991 with the publication of a safety guide on principles for the exemption of radiation sources and practices from regulatory control, and of two safety manuals on the practical application of exemption principles to waste disposal in the terrestrial and aquatic environment.

C/33. Expected duration: The expected completion date is 1991.

Project C.2.05

Support for Marine Radioactivity Monitoring

C/34. Objective: To develop and enhance marine radioactivity monitoring and assessment capabilities in Member State institutions through the provision of analytical quality control services (including marine reference materials), the development of relevant methodologies and the training of staff.

C/35. Outline of the work planned: Analytical quality control services will be enhanced through closer contacts with staff of institutions in Member States participating in intercomparison exercises for transuranic and fission product nuclides. Training of staff from such institutions will be conducted in the International Laboratory of Marine Radioactivity, Monaco, on radiochemical and radiobiological methodology as applied to the marine environment (e.g., alpha, beta and gamma spectrometry, radionuclide tracer methodology). The assessment of the total inventories of radionuclides in the world's oceans begun in 1986 will be finalized by 1990.

C/36. Expected duration: The world inventory is expected to be completed in 1990. Training and intercomparison exercises, which are part of the Agency's overall analytical quality control services and are conducted in conjunction with the Agency's Laboratory in Seibersdorf, will continue into the 1990s.

Project C.2.06

Research on Radionuclides in the Marine Environment

C/37. Objective: To provide quantitative scientific information to Member States and international and regional organizations on the behaviour and impact of radionuclides discharged to the marine environment both intentionally and accidentally.

C/38. Outline of the work planned: In co-operation with marine institutions in Member States, comparative studies of the behaviour of transuranic elements and certain fission or activation products in the marine environment will be undertaken. Marine food chain and vertical transport experiments relating to the ultimate transfer of radioactivity to man will be conducted in the Laboratory and at sea. Quantitative assessments of the relative contributions of radioactivity from natural sources, regular discharges, weapons fallout and accidents will be made on the basis of information available in the literature and with an input from a CRP which will continue until 1992.

C/39. Expected duration: The project is continuing in nature.

Project C.2.07

Radiological and Environmental Effects of Waste Disposal

C/40. Objective: To provide advice and training in radiological and environmental impact assessment techniques in relation to releases from radioactive waste disposal activities in terrestrial and aquatic environments.

C/41. Outline of the work planned: A major part of the work will be concerned with providing assistance to Member States on safety assessment methodologies for underground waste disposal. In support of this assistance, a technical document will be prepared by 1990 containing guidelines on procedures for assessment. In relation to discharges of radioactive and mixed radioactive and chemical wastes, three technical reports giving guidance on radiological and environmental impact assessment methodologies will be prepared by 1991. A technical report will be drawn up by 1992 on the assessment and control of radionuclide discharges to freshwater and coastal waters. In support of the development of environmental assessment models, a CRP on the validation of models for the transfer of radionuclides in terrestrial, urban and aquatic environments will continue until 1992 (in co-operation with the "Radiation Protection" programme). A symposium on the safety assessment of radioactive waste repositories is planned for 1989 (in co-operation with the OECD/NEA and CEC).

C/42. In addition, two technical reports will be prepared comparing the risks from sea dumping with other risks to man and comparing the sea and land disposal options for low- and intermediate-level radioactive waste disposal.

C/43. Expected duration: Continuing.

C. RADIOACTIVE WASTE MANAGEMENT

Area of Activity C.3 Decontamination and Decommissioning of Nuclear Installations

Problem I

Many Member States do not have suitable programmes for the safe decontamination and decommissioning of their nuclear facilities (Project C.3.01).

Problem II

Many Member States with uranium mining and milling programmes do not have the expertise to manage the tailings in a safe manner, especially as regards long-term disposal (Project C.3.02).

Problem III

Most Member States require advice on the preplanning and technology needed to clean up large terrestrial and aquatic ecosystems contaminated as a result of a nuclear accident and to rehabilitate damaged facilities (Project C.3.03).

Project C.3.01

Guidance on the Decontamination and Decommissioning of Nuclear Installations

C/44. Objective: To provide a forum for the exchange of information by collecting, reviewing and disseminating the latest technical, safety and regulatory data on decontamination and decommissioning and to provide guidance and assistance to Member States in these areas.

C/45. Outline of the work planned: Work will be divided into two areas: first, the development of technical and regulatory guidance and, secondly, the review of the status of selected technologies and management systems for decontamination and decommissioning.

C/46. In the first area, two technical reports will be prepared by 1992, one on equipment and techniques necessary to monitor for compliance with criteria relating to decommissioning termination surveys and with unrestricted use criteria, and the second on project planning and management for the decommissioning of small and large nuclear facilities.

C/47. In the second area, technical reports will be prepared on the use of remotely operated equipment in the decommissioning, rehabilitation, isolation or disposal of nuclear facilities after normal operation or a serious accident and on the development of decontamination technology. The Agency's participation as an observer in NEA and CEC co-operative decommissioning projects will serve as an important source of information in connection with the above. A CRP on decontamination technology will be initiated in 1989.

C/48. Expected duration: Individual parts of the project will be completed by the dates indicated.

Project C.3.02

Decommissioning of Uranium Mining and Milling Facilities

C/49. Objective: To provide a forum for the exchange of information by collecting, reviewing and disseminating the latest technical, safety and regulatory data on the management of uranium mill tailings and to provide guidance and assistance to Member States in this area.

C/50. Outline of the work planned: Technical reports reviewing the latest developments in the design and safety assessment of uranium mill tailings technologies and disposal systems and identifying and reviewing factors relevant to the decommissioning of mining and milling facilities, mines and sites will be issued in 1991 and 1992 respectively. Advisory missions will be organized within the WAMAP framework upon request.

C/51. Expected duration: This is a new project, the TC aspects of which are continuing in nature.

Project C.3.03

Clean-up of Large Areas after a Nuclear Accident

C/52. Objective: To provide a forum for the exchange of technical information by collecting, reviewing and disseminating the latest technical data on the clean-up of large contaminated areas and the rehabilitation of seriously damaged facilities.

C/53. Outline of the work planned: Two technical reports will be prepared on the safe transport, disposal and stabilization of very large volumes of contaminated material from the clean-up of large areas after a nuclear accident and on the rehabilitation, decommissioning and disposal alternatives for a nuclear reactor after a serious accident. It is also planned to issue a safety guide on planning for and control of the clean-up of large areas.

C/54. Expected duration: This is a new project which is expected to end in 1991.

PROGRAMME C: RADIOACTIVE WASTE MANAGEMENT

Summary of main means by Area of Activity for 1989/1990Table 12

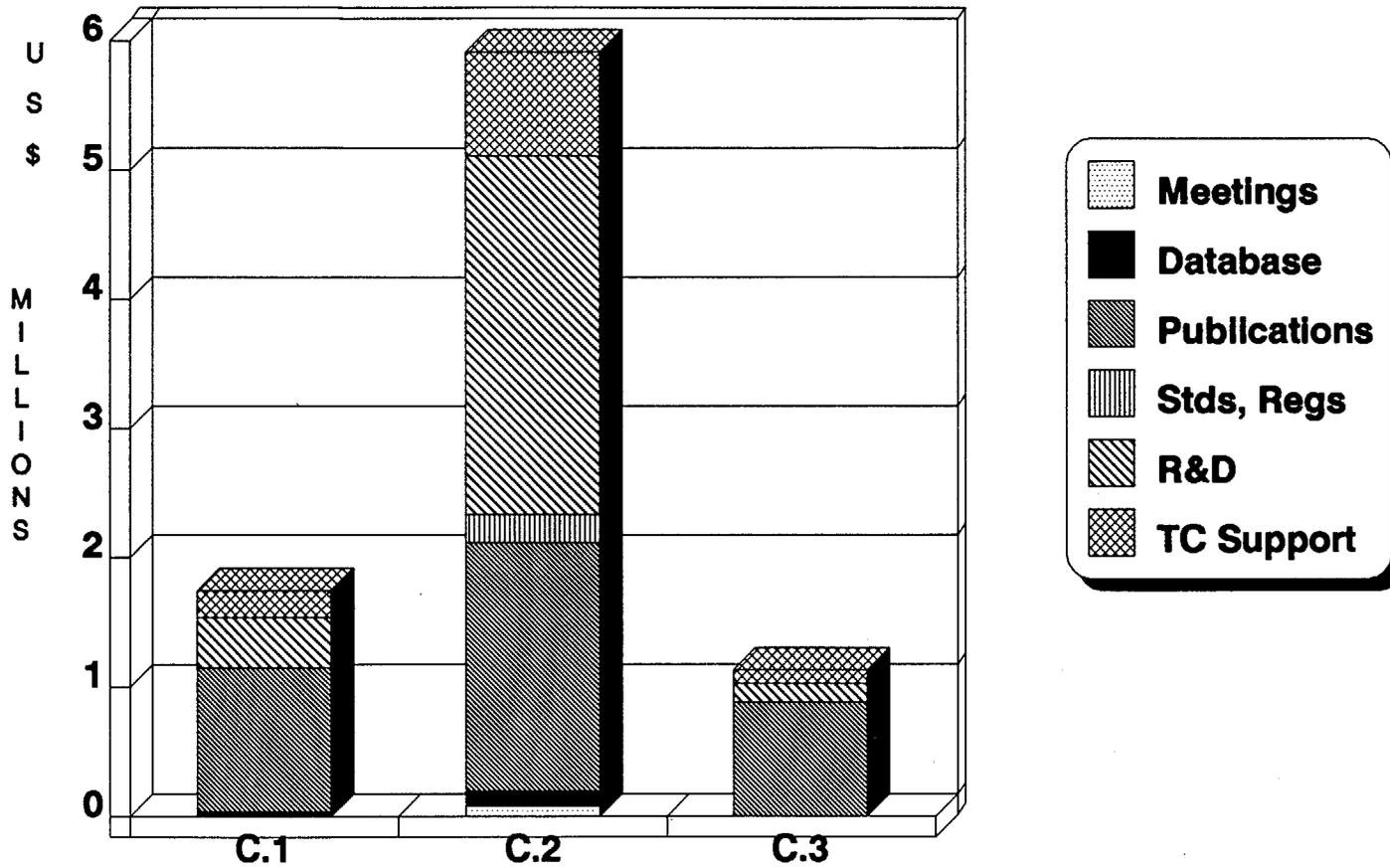
Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O										
C.1. Handling, Treatment, Conditioning and Storage of Radio- active Waste	NENF	3.5	2.0	-	-	41 000	1 110 000	-	-	388 000	-	210 000	-	1 749 000
C.2. Radioactive Waste Disposal	NENF	5.7	3.5	-	81 000	115 000	1 792 000	-	216 000	405 000	-	230 000	-	2 839 000
	RIML	7.5	14.0	-	-	-	128 000	-	-	2 379 000	-	574 000 a/	-	3 081 000
C.3. Decontamination and Decommissioning of Nuclear Installations	NENF	1.3	1.5	-	-	-	879 000	-	-	144 000	-	108 000	-	1 131 000
Programme C Total		18.0	21.0	-	81 000	156 000	3 909 000	-	216 000	3 316 000	-	1 122 000	-	8 800 000

a/ Represents TC-oriented activities conducted by RIML.

C. Radioactive Waste Management

Main Means by Area of Activity

Graph 3



PROGRAMME C: RADIOACTIVE WASTE MANAGEMENT

Summary of Regular Budget estimates by Area of ActivityTable 13

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure increase(decr.) %		1989 at 1988 prices	Expenditure increase(decr.) %		1990 at 1988 prices	Price incr. %	1989 with price incr.	Price incr. %	1990 with price incr.
C.1. Handling, Treatment, Conditioning and Storage of Radioactive Waste	NENF	955 000	(166 000)	(17.4)	789 000	79 000	10.0	868 000	3.7	818 000	3.5	931 000
C.2. Radioactive Waste Disposal	NENF	1 252 000	197 000	15.7	1 449 000	(203 000)	(14.0)	1 246 000	3.7	1 502 000	3.5	1 337 000
	RIML	1 440 000	(5 000)	(0.3)	1 435 000	(10 000)	(0.7)	1 425 000	5.6	1 515 000	4.1	1 566 000
C.3. Decontamination and Decommissioning of Nuclear Installations	NENF	583 000	(20 000)	(3.4)	563 000	(53 000)	(9.4)	510 000	3.7	584 000	3.5	547 000
Total - Programme C		4 230 000	6 000	0.1	4 236 000	(187 000)	(4.4)	4 049 000	4.3	4 419 000	3.7	4 381 000

C. RADIOACTIVE WASTE MANAGEMENT

Programme C: List of projects and estimated total resources for 1989/1990

Table 14

Area of Activity	Project Code	Estimated Resources for 1989/1990			
		Regular Budget	Extra- Budgetary	TC	Total
C.1.	Handling, Treatment, Conditioning and Storage of Radioactive Waste				
	C.1.01 Processing and Storage of High-Level and Alpha- Bearing Wastes	504 000			
	C.1.02 Processing and Storage of Waste from Nuclear Power Plants and Nuclear Fuel Cycle Facilities	792 000	124 000		
	C.1.03 Processing and Storage of Waste from Nuclear Applications	453 000			
	Sub-total	1 749 000	124 000	1 700 000	3 573 000
C.2.	Radioactive Waste Disposal				
	C.2.01 Research and Technical Aspects of Waste Disposal	1 000 000			
	C.2.02 Regulatory Aspects of Waste Disposal	401 000			
	C.2.03 Exemption of Radiation Sources from Regulatory Control	459 000			
	C.2.05 Support for Marine Radioactivity Monitoring (RIML)	1 302 000	60 000		
	C.2.06 Research on Radionuclides in the Marine Environment (RIML)	1 779 000	220 000		
	C.2.07 Radiological and Environmental Effects of Waste Disposal	979 000	39 000		
	Sub-total	5 920 000	319 000	774 000	7 013 000
C.3.	Decontamination and Decommissioning of Nuclear Installations				
	C.3.01 Guidance on the Decontamination and Decommissioning of Nuclear Installations	463 000			
	C.3.02 Decommissioning of Uranium Mining and Milling Facilities	189 000			
	C.3.03 Clean-up of Large Areas after a Nuclear Accident	479 000			
	Sub-total	1 131 000	-	-	1 131 000
Total: Programme C - Radioactive Waste Management		8 800 000	443 000	2 474 000	11 717 000

PROGRAMME AREA 2

NUCLEAR APPLICATIONS

NUCLEAR APPLICATIONS

Summary of total resources by programme

Table 15

Programme	Man-years (Per Year)			Planned expenditure for programme implementation in 1989/1990				
	P	GS	M&O	Regular Budget estimates	Funds from other UN organizations	TC resources	Other extra- budgetary resources	Total
D. Food and Agriculture	17.0 [12.0]	8.0 [14.8]	- [14.8]	16 204 000	2 815 000	17 960 000	7 844 000	44 823 000
E. Human Health	16.5 [1.4]	12.0 [6.1]	- [1.8]	9 046 000	640 000	8 970 000	598 000	19 254 000
F. Industry and Earth Sciences	7.0 [4.0]	4.9 [8.0]	- [1.0]	5 345 000	-	11 384 000	300 000	17 029 000
G. Physical and Chemical Sciences	28.8 [4.7]	37.0 [13.6]	- [3.5]	13 854 000	800 000	18 282 000	27 323 000	60 259 000
Programme Area 2	69.3	61.9	-	44 449 000	4 255 000	56 596 000	36 065 000	141 365 000

Note: The manpower figures shown in parentheses above represent the number of Agency Laboratory staff working for the programme in question.

PROGRAMME D: FOOD AND AGRICULTURE

Area of Activity D.1
Soil FertilityProblem I

Limited capacity in tropical and sub-tropical areas to measure and assess water, phosphate and nitrogen utilization by crops as a means of improving plant productivity (Project D.1.01).

Problem II

Limited capacity in countries with deleterious soil conditions - especially high salinity and acidity - to assess the tolerance of such conditions by genotypes within important plant species (Project D.1.02).

Project D.1.01Optimizing the Use of Water, Fertilizer and Soil Resources

D/1. Objective: To assist Member States in developing capabilities to ensure the optimal use of soil nutrient and water resources, and of added fertilizer and water, in increased and sustained production of food and fuelwood.

D/2. Outline of the work planned: Work will focus on three main areas: water use for crop production; increased grain legume production; and the role of trees in maintaining soil fertility, in soil conservation and for fuelwood.

D/3. In the first area, a CRP will be conducted with the aim of evaluating nuclear techniques in comparison with traditional methods in soil-water studies (1986-90) and training courses will be organized in 1989 and 1990 on soil-water-plant relationships.

D/4. In the second field, the improvement of yield and N₂ fixation of grain legumes in South America and South East Asia will be investigated in the period up to 1992 through two CRPs.

D/5. As regards the third area, the measurement and optimization of nitrogen fixation and mineral and water use efficiency by fuelwood trees will be studied through a CRP (1988-92). A training course on this topic is planned for 1990.

D/6. Support will be provided for TC projects. In support of CRPs and TC activities, the Agency's Laboratory will help calibrate analytical equipment, provide ¹⁵N analytical services and prepare and distribute labelled fertilizers.

D/7. Expected duration: The TC component of this project is continuing in nature.

Project D.1.02

Improving the Productivity of Saline, Acidic
and Other Deleterious Soils

D/8. Objective: To assist Member States in developing capabilities to produce food and fuel on deleterious soils such as saline and highly acidic soils which seriously limit agricultural production in many countries.

D/9. Outline of the work planned: An existing CRP will continue until 1992 with the aim of identifying plant genotypes which grow on and may improve deleterious soils so that they can be used subsequently for less tolerant plants; root behaviour in relation to the use and productivity of such soils will also be examined. Support will be provided to TC projects.

D/10. Expected duration: The TC component of this project is continuing in nature.

Area of Activity D.2
Plant Breeding and Genetics

Problem I

Further genetic improvement of seed propagated crops is required in order to adapt them to the demands of modern agriculture and conditions prevailing in developing countries (Project D.2.01).

Problem II

In view of the significant shortcomings of classical mutation breeding techniques for certain plant species (for example, vegetatively propagated and perennial plants) and of the potential for dramatic improvements in the economy of mutation breeding, mutation techniques using in vitro culture need to be developed (Project D.2.02).

Project D.2.01

Established Mutation Breeding Technology for Improvement
of Seed Propagated Plants

D/11 Objective: To assist plant breeders in Member States to make optimal use of mutation breeding within the framework of their regular national efforts for genetic improvement of seed propagated crop species.

D/12. Outline of the work planned: Work will concentrate on three areas: first, the improvement of cereals, legumes and oil crops; secondly, the improvement of indigenous grain crops in Africa (e.g. sorghum, millet and cowpea); and thirdly, the collection and dissemination of information on mutant germ-plasm.

D/13. With regard to the first topic, research will be co-ordinated (1986-91) in Latin America with the aim of improving cultivars of rice, wheat and barley. Research will also be promoted on induced mutations for the improvement of oil seeds and industrial crops (1989-93) and of sesame (1989-93).

D/14. In the second area, through a co-ordinated research programme (1988-93), training activities and Laboratory services, the Agency will provide an input (i.e. the use of induced mutations) to a large-scale project in Africa on improvement of basic food crops; this project will involve co-operation with FAO and international agricultural research centres.

D/15. As regards the third area, data on mutant cultivars will be maintained in a computerized file and published periodically in the Mutation Breeding Newsletter.

D/16. A symposium on the contribution of plant mutation breeding to crop improvement is planned for 1990.

D/17. The major part of efforts under this project will comprise support for national TC projects, including training.

D/18. Expected duration: The TC component and the collection of data under this project are continuing activities.

Project D.2.02

Advanced Mutation Breeding Technology Using In Vitro Culture

D/19. Objective: To develop more effective mutation breeding technology, especially for vegetatively propagated plants and woody perennials with long generation cycles, and to develop methods for identifying desirable genetic variants, using in vitro cultures.

D/20. Outline of the work planned: Activities will centre on three areas. The first is the use of in vitro culture for the improvement of indigenous vegetatively propagated species in tropical countries, especially in Africa. Research will be promoted through a CRP on this subject in the period up to 1993.

D/21. The second area of concentration will be the development of the more efficient selection of mutants for resistance to diseases. Two CRPs will be conducted, concluding in 1993. The Agency's Laboratory will carry out much of the work, particularly as regards the establishment of optimal doses and treatment procedures for the irradiation of in vitro cultured plant material.

D/22. The third area concerns the application of modern genetics to plant breeding. Research will be co-ordinated (1987-92) on the use of induced mutations in connection with haploids and heterosis in cereals.

D/23. Support will be provided for TC projects, including on-site training at the Agency's Laboratory.

D/24. Expected duration: The TC component is continuing in nature.

Area of Activity D.3
Animal Production and Health

Problem I

Low reproductive efficiency of ruminant animals in tropical and sub-tropical countries (Project D.3.01).

Problem II

Inadequate nutrient supply for ruminant animals in tropical and sub-tropical countries (Project D.3.02).

Problem III

High prevalence of viral, bacterial and parasitic infections in ruminant animals in tropical and sub-tropical countries (Project D.3.03).

Project D.3.01

Optimization of the Reproductive Efficiency
of Livestock

D/25. Objective: To establish or improve the infrastructure required to initiate and develop programmes to optimize the reproductive efficiency of different genotypes in developing countries. RIA and enzyme-linked immunosorbent assay (ELISA) methods will be employed for measuring reproductive hormone levels in the blood and milk of domesticated livestock maintained under typical management conditions in order to identify and subsequently reduce constraints to reproductive efficiency.

D/26. Outline of the work planned: In the vast majority of cases the focus will be on the employment of RIA and ELISA methods for the measurement of the hormone progesterone in the blood or milk of a wide variety of species and breeds of livestock used for meat and milk production (cattle, sheep, goats, buffaloes and camelids). Progesterone values in conjunction with clinical examination and records of the sexual behaviour of livestock will be employed to monitor the onset of puberty and postpartum ovarian activity and the influence of different management factors and feed supplementation on these aspects of reproduction. Activities are organized on a regional basis and will focus on indigenous species of livestock in Asia (1989-93), Latin America (1989-93) and Africa (1988-92). In support of this research, standardized kits consisting of labelled progesterone, antisera and standards will be prepared and distributed to Member States from the Agency's Laboratory. These kits, together with an external assessment and quality control service, will be used to effect intra- and inter-laboratory comparisons of data, and hence ensure reliable data interpretation. Support will be given to TC projects,

including regional training courses. A regional seminar for Africa is planned for 1989.

D/27. Expected duration: The TC component of this project is continuing in nature.

Project D.3.02

Improvement of the Nutrition of Ruminant Livestock

D/28. Objective: To establish or improve the infrastructure needed for programmes on ruminant animal nutrition in developing countries which combine the use of conventional and stable and radioisotope methods for measuring the nutritional status of animals and the value of pastures, forages and other agro-industrial by-products.

D/29. Outline of the work planned: Assistance will be given in formulating feeding strategies for ruminant livestock based on locally available resources in order to alleviate nutritional inadequacies or imbalances. This will be achieved through the development and application of isotopic methods for assessing rumen function and measuring metabolic hormone levels in different genotypes fed with locally available forages and agro-industrial by-products supplemented with minerals, non-protein nitrogen and other additives. These measurements will be complemented by data on animal production and on the economics of the strategies concerned. In the period up to 1993, the work will be carried out mainly through co-ordinated research which will be arranged on a regional basis, covering indigenous species of livestock in Asia, Latin America and Africa as well as locally available feedstuffs. The Agency's Laboratory will provide training and analytical services by evaluating the potential value of local feedstuffs for ruminant livestock. Support will be provided for TC projects and training courses.

D/30. Expected duration: The TC component of this project is of a continuing nature.

Project D.3.03

Diagnosis and Control of Livestock Diseases

D/31. Objective: To establish or improve the infrastructure needed for diagnosing and controlling viral, bacterial and parasitic diseases of livestock using nuclear and related techniques in combination with conventional methods.

D/32. Outline of the work planned: Mainly through the co-ordination of research and the Agency's Laboratory, simple, reliable and easily standardized immunoassay methods will be developed for the diagnosis of diseases of major regional or interregional importance such as rinderpest, brucellosis and babesiosis (1989), and trypanosomiasis and foot and mouth disease (1990). These tests will subsequently be applied as part of control strategies and will represent the Agency's contribution to international disease control programmes (the Pan-African Rinderpest Campaign (PARC), a

D. FOOD AND AGRICULTURE

trypanosomiasis campaign in Africa and a foot and mouth disease campaign in Latin America). The tests will be based on standardized kits and reagents produced at the Agency's Laboratory and distributed to Member States participating in these programmes. Training of scientists in ELISA, DNA probe and monoclonal antibody techniques will form a major component of the initial stages of the project. Support will be provided to TC projects, including training courses.

D/33. Expected duration: The PARC campaign is due to be completed in 1994. The trypanosomiasis and foot and mouth campaigns are expected to continue well into the 1990s.

Area of Activity D.4 Insect and Pest Control

Problem I

In 20 developing countries where fruit production and export are seriously affected by Mediterranean fruit flies, the application of the best available control technology - the sterile insect technique (SIT) - is hindered by the absence of the necessary local infrastructure (Project D.4.01).

Problem II

In order to demonstrate the economic effectiveness of the SIT as a means of controlling tsetse flies transmitting animal trypanosomiasis in affected African countries, it is necessary to transfer the technology from pilot(field)-scale to area-wide applications (Project D.4.02).

Problem III

Additional research and development work is required to determine new approaches - based on nuclear techniques - for the effective suppression of insects which are of economic significance to developing countries and which are not amenable to control by available SIT approaches (Project D.4.03).

Project D.4.01

Control or Eradication of Fruit Flies

D/34. Objective: To establish or improve the infrastructure required for the efficient application of the SIT to eradicate fruit flies, with emphasis on the Mediterranean fruit fly.

D/35. Outline of the work planned: It is planned through this project to contribute to two large-scale medfly suppression programmes. The first is a campaign in Central America and Panama which FAO is expected to initiate in 1988/89 with the objective of achieving medfly eradication within 10 years. The second is in North Africa and will be co-ordinated by the Agency, provided that the necessary resources become available. Following an exploratory period of about two years, it is planned to start the campaign in 1989 and to achieve medfly suppression within five years. In the period up

to 1993 research will be carried out in support of these projects by the Agency's Laboratory and through CRPs on the reduction of costs of SIT programmes, including genetic sexing, improved trapping and diet recycling. Support for the above activities will also be provided through training. A regional seminar for Latin America is planned for 1989.

D/36. Expected duration: The project will continue well into the 1990s.

Project D.4.02

Eradication of Tsetse Flies

D/37. Objective: To develop strategies based on the SIT for large tsetse eradication projects and to assist Member States to incorporate these strategies into area-wide tsetse eradication programmes.

D/38. Outline of the work planned: Following the eradication of one species of tsetse fly from a 1500 km² test area in Nigeria in 1987, it is planned (provided that the necessary extrabudgetary resources become available) in 1988 to embark upon an expanded second phase of this programme to eradicate tsetse flies from a 12 000 km² agricultural development project in the same country. Eradication is expected to be achieved within 5-6 years.

D/39. Research and development work supported through a CRP and with the active participation of the Agency's Laboratory will focus on improvements in mass-rearing, handling and sterilization procedures and the strategic use of sterile male tsetse flies for large SIT eradication projects. Cost reduction and increased efficacy of the technology are a prime goal. Integration of the SIT with other environmentally friendly control technologies will be investigated. The development of cost-benefit analyses for tsetse eradication by the SIT will be initiated in conjunction with the field project in Nigeria. Support will also be provided for individual TC projects in other countries and for training courses.

D/40. Expected duration: The second phase of this project will be completed in 1993-94.

Project D.4.03

New Techniques for Controlling Major Insect Pests

D/41. Objective: To develop new, environmentally safe suppression techniques for major insect pests based on nuclear techniques.

D/42. Outline of the work planned: Primary activities will be the development through CRPs and the Agency's Laboratory of genetic methods based on nuclear and genetic engineering techniques for suppressing populations of pests not readily amenable to control by the SIT. F₁ sterility, which involves the release of irradiated, partially sterile insects that produce sterile progeny, will be the main topic of research. For the species of Lepidoptera selected, appropriate rearing technology will be developed, the goal being to develop simple, inexpensive diets from local materials. Field studies will be implemented where appropriate. A study will be made of the practicality of using gene transfer technology to improve the SIT, F₁ sterility and other nuclear-based insect control technologies. In addition, isotopes will be used as tags for studying insect migration and dispersal. It

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is expected that, in the period 1988-92, the above research activities will identify potential practical insect control technologies and will lead to the establishment of large-scale field tests.

D/43. Expected duration: CRPs on F₁ sterility and genetic engineering will be concluded by 1992.

Area of Activity D.5 Agrochemicals and Residues

Problem I

Pesticide use in developing countries in tropical and subtropical areas results in levels of residues that are of concern to health and trade (Project D.5.01).

Problem II

Developing countries with limited resources of animal feed require more efficient techniques for improving the nutritional value of agricultural residues and wastes (Project D.5.02).

Problem III

Need to minimize the potential harmful effect on food, feed and other agricultural products from accidental releases of radionuclides into the environment (Project D.5.03).

Project D.5.01

Monitoring Pesticide Residues in Food and the Environment

D/44. Objective: To assist developing Member States to strengthen their capabilities in assessing the impact of agrochemical use and in developing methods and procedures for their efficient and safe application.

D/45. Outline of the work planned: Work will focus on three main areas: first, the development and improvement of methods for measuring contaminants and ascertaining their fate in food, feed, soil, water and biota; secondly, the development and improvement of methods for formulating agrochemicals to reduce environmental contamination; and thirdly, the development of alternative chemical approaches to pest control, including insect attractant-toxicant combinations.

D/46. The bulk of activities relate to the first area in which research will be promoted between 1988 and 1995 through CRPs on such topics as radiotracer studies of DDT in tropical environments, radiotracer studies of fungicide residues in food plants, and the environmental fate of molluscicides.

D/47. In the second field, research will be co-ordinated on the development and evaluation of controlled-release formulations of pesticides to reduce residues and increase efficacy (CRP 1983-89).

D/48. In the third area, a CRP will be conducted from 1989 to 1994 on the use of attractants, pheromones and pesticides combined in controlled-release formulations for control of specific insects. The results will, among other things, contribute to work performed under Project D.4.03.

D/49. Support will be provided for TC projects, including training.

D/50. Expected duration: The TC component is continuing in nature.

Project D.5.02

Bioconversion of Lignocellulosic Agricultural Residues

D/51. Objective: To develop and improve the use of indigenously occurring microorganisms for the bioconversion of agricultural residues of high lignocellulosic content to products of use in animal nutrition and to evaluate relevant bioconversion processes and products.

D/52. Outline of the work planned: Work will focus on the selection of indigenous microorganisms and fungi to be screened in Member States for ligninolytic activity. This will be done through a CRP, coupled with biannual training courses. In connection with the CRP, the Agency's Laboratory will assist national laboratories in improving methods of screening microorganisms for their ability to degrade lignin. Activities will be carried out in co-operation with the International Centre for Genetic Engineering and Biotechnology in Trieste. A seminar on the bioconversion of agricultural residues will be held in 1989.

D/53. Expected duration: The project will be completed by 1992.

Project D.5.03

Alleviating the Adverse Effects of Accidental Releases of Radionuclides into the Agricultural Environment

D/54. Objective: To supply information and/or guidelines on methods for assessing and minimizing the potential exposure of human populations through consumption of contaminated food and through agriculture and food production following an accidental release of radionuclides into the environment.

D/55. Outline of the work planned: The project will be partly funded by FAO and resources are expected to be available until 1990. Research will be promoted in the period up to 1993 on radionuclide behaviour in fragile agricultural environments and minimization of entry of radionuclides into food chains, and on the prevention of radionuclide contamination of food chains. Information will be compiled with the help of the Agency's Laboratory on radionuclide behaviour in the agricultural environment, the results being published as a technical document in 1991.

D/56. Expected duration: This is a new project which will be completed by 1993.

Area of Activity D.6
Food Irradiation

Problem I

There is a need to establish and put into practice national regulations concerning the safe operation of food irradiation facilities and trade in irradiated foodstuffs (Project D.6.01).

Problem II

In developing countries considering the introduction of food irradiation, there is insufficient capability to demonstrate the technical and economic viability of food irradiation processes (Projects D.6.02 and D.6.03).

Project D.6.01

Guidelines for Acceptance of Irradiated Food in Trade

D/57. Objective: To remove barriers and constraints in international trade in irradiated foods and to assist Member States in developing or amending national regulations to bring them into line with the Codex General Standard for Irradiated Foods and Recommended International Code of Practice for the Operation of Radiation Facilities Used for Treatment of Food.

D/58. Outline of the work planned: In spite of the fact that the Codex Alimentarius Commission has issued recommendations for the acceptance of irradiated food, a number of Member States, including several major food importing countries, do not permit the import of and trade in irradiated foods. If food irradiation is to be used more widely, it is essential to seek ways and means of removing such constraints.

D/59. In connection with the major conference in 1988 on acceptance, control of and trade in irradiated foods jointly organized by FAO, the Agency, WHO, the International Trade Centre (ITC) of the United Nations Conference on Trade and Development/General Agreement on Tariffs and Trade (UNCTAD/GATT), it is possible that a degree of international consensus may emerge which would lead to the gradual removal of legal barriers to international trade in irradiated food. One means of achieving this would be to encourage acceptance by national legislatures of the principle that irradiation should be regarded as a process applicable to a wide range of foods, thus obviating the need to obtain legal clearance for each foodstuff separately.

D/60. In support of the above efforts, a technical report will be prepared in 1990 containing a model set of regulations that meet the recommendations of the Codex Alimentarius. Also, a set of manuals representing a code of technological practice for specific applications of food irradiation will be issued in 1989. The applications covered will include sprout inhibition, insect disinfestation of fresh and dried foods, the decontamination or disinfection of meat, poultry, sea food and spices, and extension of the shelf-life of fish. Training manuals for food control officials and operators of food irradiation facilities will be drawn up by 1990 and training courses will be organized. Public information material on food irradiation will also be produced.

D/61. The expertise and financial support of the International Consultative Group on Food Irradiation (ICGFI) will play a major role in the above work. The detailed programme of the Group's activities is prepared annually.

D/62. Expected duration: Continuing.

Project D.6.02

Commercial Use of Food Irradiation

D/63. Objective: To facilitate the introduction of food irradiation on a commercial scale.

D/64. Outline of the work planned: The principal activity will be to provide assistance with the general and country-orientated assessment of the feasibility, effectiveness and comparative economic advantages of food irradiation. The regional approach to co-operation will be a major element, with CRPs being conducted in Asia until 1990, in Latin America until 1991 and in Africa, Europe and the Middle East until 1992. Support will be provided for TC projects, including training. The International Facility for Food Irradiation Technology (IFFIT) will continue to be the centre of the Agency's training activities for personnel from food irradiation facilities, the agreement between the Dutch Government, FAO and the Agency having been extended until the end of 1990.

D/65. It is planned in 1990 to initiate research on the development of techniques for determining whether food has been irradiated (CRP 1990-94).

D/66. Expected duration: Five years.

Project D.6.03

Irradiation for Insect and Pathogen Control

D/67. Objective: To assess the effectiveness and feasibility of using irradiation as an alternative to fumigation and other existing methods for disinfesting and disinfecting food and food ingredients and to draw up international guidelines which will facilitate the use and international acceptance of this process.

D/68. Outline of the work planned: Research will be co-ordinated on three subjects: the applicability of irradiation as a quarantine treatment in place of fumigation (CRP 1985-89); the applicability of irradiation for controlling infectivity of food-borne parasites (CRP 1988-92); and the use of combination treatments (irradiation and other processes) to improve food quality (CRP 1989-93).

D/69. Expected duration: The current phase will continue until 1993.

PROGRAMME D: FOOD AND AGRICULTURE

Summary of main means by Area of Activity for 1989/1990

Table 16

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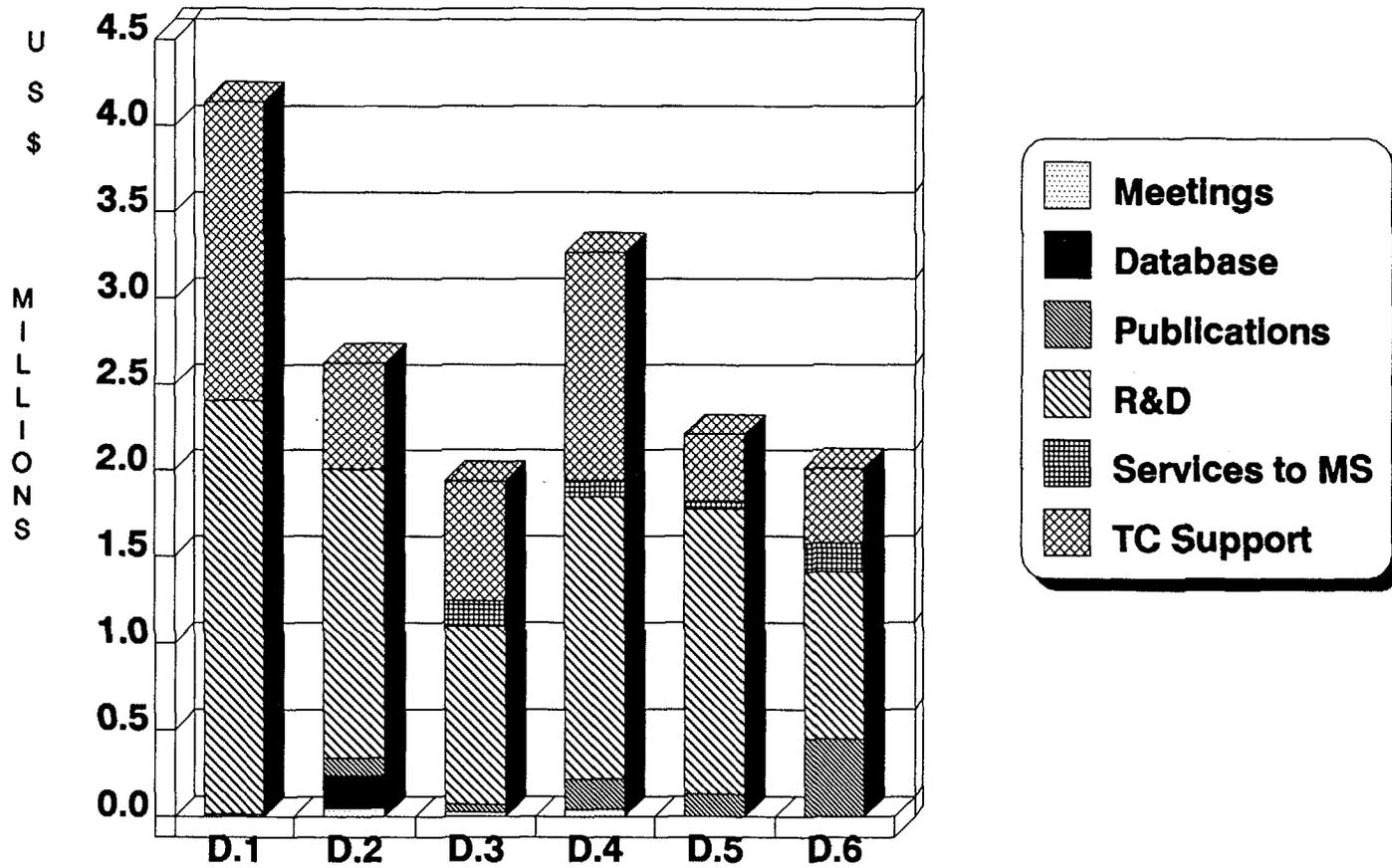
Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O										
D.1. Soil Fertility	RIFA	4.2 [4.6]	1.4 [4.4]	- [2.7]	-	-	18 000	-	-	2 390 000	-	1 732 000	-	4 140 000
D.2. Plant Breeding and Genetics	RIFA	2.2 [2.5]	1.4 [1.5]	- [3.6]	50 000	187 000	105 000	-	-	1 670 000	-	617 000	-	2 629 000
D.3. Animal Production and Health	RIFA	2.2 [0.3]	1.3 [2.5]	- [1.6]	30 000	-	43 000	-	-	1 024 000	150 000	692 000	-	1 939 000
D.4. Insect and Pest Control	RIFA	2.1 [3.3]	1.3 [4.2]	- [4.9]	44 000	-	174 000	-	-	1 625 000	100 000	1 326 000	-	3 269 000
D.5. Agrochemicals and Residues	RIFA	2.2 [1.3]	1.2 [2.2]	- [2.0]	-	-	134 000	-	-	1 642 000	50 000	387 000	-	2 213 000
D.6. Food Irradiation	RIFA	4.1	1.4	-	-	-	446 000	-	-	967 000	166 000	435 000	-	2 014 000
Programme D Total		17.0	8.0	-	124 000	187 000	920 000	-	-	9 318 000	466 000	5 189 000	-	16 204 000

Note: The manpower figures shown in parentheses above represent the number of man-years of Agency Laboratory staff working for that particular area of activity.

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Main Means by Area of Activity

Graph 4



PROGRAMME D: FOOD AND AGRICULTURE

Summary of Regular Budget estimates by Area of ActivityTable 17

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure increase(decr.) %		1989 at 1988 prices	Expenditure increase(decr.) %		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
D.1. Soil Fertility	RIFA	1 980 000	(64 000)	(3.2)	1 916 000	44 000	2.3	1 960 000	4.8	2 008 000	3.8	2 132 000
D.2. Plant Breeding and Genetics	RIFA	1 245 000	(11 000)	(0.9)	1 234 000	(6 000)	(0.5)	1 228 000	4.8	1 293 000	3.8	1 336 000
D.3. Animal Production and Health	RIFA	888 000	48 000	5.4	936 000	(55 000)	(5.9)	881 000	4.8	980 000	3.8	959 000
D.4. Insect and Pest Control	RIFA	1 548 000	4 000	0.3	1 552 000	(42 000)	(2.7)	1 510 000	4.8	1 626 000	3.8	1 643 000
D.5. Agrochemicals and Residues	RIFA	1 005 000	19 000	1.9	1 024 000	24 000	2.3	1 048 000	4.8	1 073 000	3.8	1 140 000
D.6. Food Irradiation	RIFA	956 000	32 000	3.3	988 000	(89 000)	(9.0)	899 000	4.8	1 035 000	3.8	979 000
Total - Programme D		7 622 000	28 000	0.4	7 650 000	(124 000)	(1.6)	7 526 000	4.8	8 015 000	3.8	8 189 000

Programme D: List of projects and estimated total resources for 1989/1990

Table 18

Area of Project Activity Code	Estimated Resources for 1989/1990			
	Regular Budget	Extra- Budgetary a_/	TC	Total
D.1. Soil Fertility				
D.1.01 Optimizing the Use of Water, Fertilizer and Soil Resources	3 569 000	539 000		
D.1.02 Improving the Productivity of Saline, Acidic and Other Deleterious Soils	571 000	204 000		
Sub-total	4 140 000	743 000	9 014 000	13 897 000
D.2. Plant Breeding and Genetics				
D.2.01 Established Mutation Breeding Technology for Improvement of Seed Propagated Plants	1 237 000	410 000		
D.2.02 Advanced Mutation Breeding Technology Using In Vitro Culture	1 392 000	2 023 000 b_/		
Sub-total	2 629 000	2 433 000	2 350 000	7 412 000
D.3. Animal Production and Health				
D.3.01 Optimization of the Reproductive Efficiency of Livestock	739 000	535 000		
D.3.02 Improvement of the Nutrition of Ruminant Livestock	514 000	115 000		
D.3.03 Diagnosis and Control of Livestock Diseases	686 000	1 613 000		
Sub-total	1 939 000	2 263 000	1 612 000	5 814 000
D.4. Insect and Pest Control				
D.4.01 Control or Eradication of Fruit Flies	1 282 000	258 000		
D.4.02 Eradication of Tsetse Flies	1 214 000	2 591 000		
D.4.03 New Techniques for Controlling Major Insect Pests	773 000	320 000		
Sub-total	3 269 000	3 169 000	1 560 000	7 998 000
D.5. Agrochemicals and Residues				
D.5.01 Monitoring Pesticide Residues in Food and the Environment	1 720 000	117 000		
D.5.02 Bioconversion of Lignocellulosic Agricultural Residues	281 000	1 142 000		
D.5.03 Alleviating the Adverse Effects of Accidental Releases of Radionuclides into the Agricultural Environment	212 000	340 000		
Sub-total	2 213 000	1 599 000	1 096 000	4 908 000
D.6. Food Irradiation				
D.6.01 Guidelines for Acceptance of Irradiated Food in Trade	453 000	151 000		
D.6.02 Commercial Use of Food Irradiation	1 097 000	150 000		
D.6.03 Irradiation for Insect and Pathogen Control	464 000	151 000		
Sub-total	2 014 000	452 000	2 328 000	4 794 000
Total: Programme D - Food and Agriculture	16 204 000	10 659 000	17 960 000	44 823 000

a_/ Includes funds from other UN organizations.

b_/ The total of \$1 300 000 for the upgrading of the training facilities at the Agency's Laboratory at Seibersdorf is included in the amount shown against this project, although the new facilities will also serve other programmes, including "Human Health", "Industry and Earth Sciences" and "Physical and Chemical Sciences".

PROGRAMME E: HUMAN HEALTH

Area of Activity E.1
Nuclear Medicine

Problem I

The provision of high-quality medical care in many developing countries is hindered by the lack of affordable and reliable nuclear diagnostic services (Projects E.1.01, E.1.02, E.1.03, E.1.04, E.1.05, E.1.06, E.1.08).

Problem II

Developments in several clinical areas where nuclear and non-nuclear medical techniques potentially overlap or compete raise the question of which are the most appropriate for developing countries (Project E.1.07).

Project E.1.01

Strengthening Capabilities for In Vitro Assays

E/1. Objective: To assist hospitals in developing countries in introducing commonly used radionuclide-based in vitro diagnostic assays and in developing technical expertise for the indigenous production of the reagents required in a country or region, and to promote appropriate quality control measures for the proper conduct of such assays.

E/2. Outline of the work planned: Under regional programmes in Asia and the Pacific (RCA) and Latin America (ARCAL), activities initiated in 1986 and 1987 respectively to promote the use of bulk reagents and quality control measures for assays of thyroid-related hormones will continue until 1989. The first step was to supply imported bulk reagents, and indigenous capabilities are gradually being developed for the production of such reagents by way of regional training courses, fellowships, TC projects and CRPs. Regional training courses and national workshops will be organized for both regions. Fourteen countries in the RCA region and 12 countries in the ARCAL region are participating in the programme.

E/3. It is proposed to introduce a similar regional scheme for Africa in 1989.

E/4. In addition to the above regional activities, support will continue to be provided for country-specific TC projects.

E/5. Expected duration: The RCA and ARCAL projects are expected to end in 1989. The African programme to be introduced in 1989 will continue for three years.

Project E.1.02

Diagnosis of Communicable Diseases

E/6. Objective: To develop radionuclide-based in vitro techniques for the diagnosis and epidemiology of communicable diseases such as tuberculosis, schistosomiasis and malaria.

E/7. Outline of the work planned: Four CRPs which were initiated in 1987-88 will continue to focus on the development of radionuclide-based diagnostic and epidemiological tools for tuberculosis, malaria and schistosomiasis. The most appropriate methods and reagents produced by modern biotechnology will be selected and evaluated for their applicability in detecting antigens and predicting the efficacy of chemotherapy in tuberculous meningitis and schistosomiasis, and in monitoring the transmission of malarial parasites. Also, radiation immobilization methods will be developed which will permit the storage and use of diagnostic reagents at ambient temperatures. By 1990 sufficient progress is expected to have been made to allow the initiation of regional CRPs to assess further the applicability of the various methods and reagents or to promote technology transfer. The incorporation in these CRPs of new biotechnological methods and radionuclide tracers (such as DNA probes) for these and other communicable diseases is envisaged. Close co-operation will be maintained with WHO.

E/8. A regional seminar for Latin America is planned for 1989.

E/9. Expected duration: The four CRPs started in 1987-88 will be completed in 1990-91. If the results are positive, it is expected that regional and country-orientated programmes will be established for the purpose of technology transfer.

Project E.1.03

Thyroid Function in Endemic Goitre Areas

E/10. Objective: To develop optimal nuclear techniques for the study of thyroid function in iodine deficiency areas and to investigate neonatal thyroid deficiency in these regions.

E/11. Outline of the work planned: The incidence of neonatal hypothyroidism is reported to be very high in endemic iodine deficiency areas. If not detected soon after birth and if left uncorrected, it produces severe mental retardation and other growth abnormalities in children. However, if diagnosed early and if thyroid replacement therapy can be instituted in time, children may have normal growth and development. Available techniques for the survey of thyroid deficiency in children are expensive and complicated. Through a CRP, simple inexpensive techniques using indigenously prepared reagents will be promoted and an appropriate strategy for screening neonatal hypothyroidism in developing countries will be established. The effect of the adverse climatic conditions prevailing in the tropical countries on the blood samples collected in the field survey during their transfer to the national central laboratory will also be studied. The work will be conducted in co-operation with WHO.

E/12. Expected duration: This CRP is to be established in 1988 and will continue until the end of 1990.

Project E.1.04

Development of Indigenous Nuclear Medicine Resources

E/13. Objective: To help establish in vivo nuclear medicine diagnostic investigations in developing countries and to promote the overall effective use of nuclear medicine in medical diagnosis.

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E/14. Outline of the work planned: It is expected that technical assistance will be provided in establishing or upgrading 25-30 laboratories every year for the performance of common clinical nuclear medicine procedures for in vivo studies. The gradual trend towards more sophisticated methods and instruments for non-invasive in vivo diagnostic procedures is likely to increase further in future. Through the above TC activities, national or regional self-reliance and regional co-operation will be promoted.

E/15. An interregional training course will be held every year, mostly for young nuclear medicine specialists from developing countries.

E/16. Expected duration: As the project comprises mainly TC activities, it will be of a continuing nature.

Project E.1.05

Quality Control and Maintenance of Nuclear Medicine Equipment

E/17. Objective: To establish appropriate methods for the quality control and maintenance of nuclear medicine equipment in developing countries.

E/18. Outline of the work planned: The sophisticated instruments likely to be supplied by the Agency to institutes in developing countries in future must be accompanied by expert assistance and training programmes to make the recipient institutes proficient in maintaining appropriate quality control and to enable them to carry out preventive maintenance procedures for their instruments so as to reduce the frequency of breakdowns. This assistance will be provided through existing regional CRPs in Latin America, Asia and the Pacific, and Africa. Regional training courses and national workshops will also be organized. The difficulties faced by developing countries in procuring spare parts will be studied with the help of consultants in 1989. As the latest generation of nuclear medicine instruments - particularly those involving data processing and tomographic systems - are introduced, new regional programmes will be set up to strengthen local quality control capabilities. Support will be provided for TC projects.

E/19. Expected duration: Continuing.

Project E.1.06

Dynamic Studies of Organ Function

E/20. Objective: With the increasing use of gamma cameras and computers as an integral system for nuclear imaging, most imaging work in future will take the form of dynamic functional studies. The aim is to assist developing countries in applying such studies in the diagnosis of lung, heart and brain function.

E/21. Outline of the work planned: A CRP on lung imaging with radioaerosols currently under way in Asia and the Pacific will provide developing countries with the capability to carry out both ventilation and perfusion imaging of the lungs for the diagnosis of many lung diseases.

E/22. A study will be made in 1989 of the possibility of performing certain nuclear cardiology studies with single probes equipped with new types of detector coupled to microprocessors so as to bring vital studies of heart

function within the reach of many developing countries which cannot afford expensive gamma camera studies. It is planned to establish a three-year CRP on this subject in 1990.

E/23. In recent years a significant area of development in nuclear medicine has been neurological and neuropsychiatric studies of cerebral function performed with radionuclides and tomographic imaging devices. It is planned in 1990 to study the advisability and the feasibility of transferring this emerging technology to developing countries.

E/24. Expected duration: The CRP on lung imaging will end in 1990, while the studies relating to the heart and brain will continue until 1992-93.

Project E.1.07

Cost-Effectiveness of Nuclear and Non-Nuclear Procedures for Medical Diagnosis

E/25. Objective: To develop optimal diagnostic strategies for developing countries through the evaluation of in vitro and in vivo nuclear and non-nuclear techniques.

E/26. Outline of the work planned: There are many problems in clinical diagnosis where both nuclear and non-nuclear procedures are helpful. In some cases information obtained from differing technologies is complementary while in many other situations deployment of multiple technologies is not at all cost-effective. For developing countries where resources are scarce, definite recommendations as to the effectiveness of one technology compared with the other are necessary. One representative area each for in vivo and in vitro nuclear medicine categories will be selected for study, with special emphasis on the methodology for the comparative assessment of the cost-effectiveness of diagnostic medical techniques.

E/27. Through an existing CRP, a comparison will be made of ultrasound and nuclear imaging techniques for the diagnosis of liver diseases common in developing countries. It is planned to establish a further CRP in 1990 to compare the efficacy and relative costs of radioimmunoassay methods and non-nuclear enzyme-linked assays for the diagnosis of infectious hepatitis.

E/28. Expected duration: The CRP comparing ultrasound and nuclear imaging techniques will end in 1990 and that on infectious hepatitis in 1992.

Project E.1.08

Early Diagnosis of Cancer by Nuclear Medicine Methods

E/29. Objective: To assist in the development of in vitro and in vivo nuclear techniques likely to be useful for the early diagnosis of cancer in developing countries.

E/30. Outline of the work planned: There is continuing rapid development in both in vitro and in vivo techniques for the early diagnosis of cancer. Monoclonal antibodies specific for a variety of tumours when labelled with a suitable radionuclide can be used for in vivo imaging of tumours (immunoscintigraphy). Similar specific monoclonal antibodies are also increasingly useful for in vitro assay procedures to detect tumour markers.

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The feasibility of introducing these techniques in the conditions of developing countries will be assessed in 1989 and, if the results are favourable, a CRP will be initiated on this subject in 1990. A seminar on early diagnosis of cancer is planned for 1990.

E/31. Expected duration: This is a new project which will continue until 1992.

Area of Activity E.2 Applied Radiation Biology and Radiotherapy

Problem I

Insufficient capacity in developing countries to assess local microbiological burdens and activity under prevailing environmental conditions as a basis for the establishment of national programmes for the radiation sterilization of medical supplies, tissue grafts and pharmaceuticals (Project E.2.01).

Problem II

Existing medical practices in developing countries do not provide adequate and accurate radiation therapy for tumours (Projects E.2.03 and E.2.05).

Project E.2.01

Radiation Sterilization of Medical Supplies

E/32. Objective: To help upgrade the standard of national health-care services in developing countries by eliminating the risks of cross-infectious diseases through the indigenous provision of sterility-quality-controlled medical supplies, including pharmaceuticals and biological tissue grafts

E/33. Outline of the work planned: Agency support for the establishment of national programmes for the radiation sterilization of local medical supplies (including pharmaceuticals and relevant raw materials) will focus on the development of local capabilities regarding the application of radiation microbiological principles and assessment methods which are essential for the sterility quality assurance of such supplies under prevailing environmental conditions.

E/34. Activities will centre on two geographical areas, namely Africa and the Middle East, and Asia and the Pacific. In the former area, where seven developing countries have already acquired national irradiators under the Agency's TC programme, an existing CRP will aim at enhancing the indigenous capacity to assess local microbiological burdens for effective radiation processing. In Asia and the Pacific, a CRP already under way within the RCA framework will deal with criteria and guidelines for the radiation sterilization of biological tissue grafts for clinical surgical use, including the assessment of the quality control of grafts from the point of view of sterility and clinical aspects. Both CRPs will generate region-specific microbiological data needed for the formulation by national authorities of local technical criteria and guidelines which are an essential part of QC procedures and practices. Technical co-operation will mainly take the form of

training and will include an annual course for Asia and the Pacific (RCA) on quality assurance aspects of radiation sterilized tissue allografts.

E/35. Expected duration: Both CRPs will be completed in 1990. TC activities will continue.

Project E.2.02

Fermentation Processing of Cassava

E/36. Objective: To develop and evaluate the technical feasibility and potential of radiation biology techniques for improving the traditional cassava fermentation process to increase the yield of nutrient proteins in the final product.

E/37. Outline of the work planned: The CRP initiated in 1986 with the aim of developing and assessing suitable nuclear techniques and other applications of radiation biology and radiation mutagenesis will be completed in 1989.

E/38. Expected duration: The project will be terminated in 1989.

Project E.2.03

Radiotherapy of Cancer of the Cervix

E/39. Objective: To build up and improve health-care services in developing countries for the treatment and control of cancer of the cervix through the development of facilities for, and local expertise in, intracavitary radiotherapy.

E/40. Outline of the work planned: In Africa, local facilities and technical skills will be upgraded through TC projects, and local physicians will receive training in aspects of current radiotherapy practices. A seminar on organization and training in radiotherapy is planned for 1989.

E/41. In Asia and the Pacific, a CRP on the use of computers in accurate treatment planning will be established in 1989 within the RCA framework.

E/42. Expected duration: Support for TC projects is a continuing activity. The CRP in Asia and the Pacific will be completed in 1992.

Project E.2.05

Assistance in Radiotherapy Physics and Clinical Dosimetry

E/43. Objective: To develop and promote accurate radiotherapy practices for tumours, including those of head and neck prevalent in developing countries.

E/44. Outline of the work planned: Accurate treatment planning programmes for specific tumours are available in advanced countries. It is planned to establish a CRP to adapt the relevant factors in the radiotherapy of head and neck tumours to local conditions in developing countries. Also, training will be provided through TC projects to strengthen the clinical dosimetry skills of medical physicists and radiotherapists to enable them to carry out accurate planning of treatment involving combined brachytherapy and external beam irradiation and to assess better the results of such treatment.

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E/45. Expected duration: This is a new project. The CRP will be completed by 1992.

Area of Activity E.3 Dosimetry

Problem I

The safe and effective application of ionizing radiation in developing countries is hindered by a lack of locally available, reliable standardization and calibration services for the measurement of radiation doses (Projects E.3.01, E.3.02 and E.3.03).

Project E.3.01

Secondary Standard Dosimetry Laboratory Network

E/46. Objective: To operate and further develop a network of Secondary Standard Dosimetry Laboratories (SSDLs) in Member States, and to raise the level of work performance of existing SSDLs to internationally acceptable standards.

E/47. Outline of the work planned: It is expected that a few new SSDLs will be established in the period 1989-90 and that assistance in improving the performance of existing SSDLs will continue. Intercomparison services will be provided to about 20 SSDLs by means of transportable ionization chambers. For SSDLs already engaged in radiation protection and environmental measurements, a new intercomparison service will be offered using a transportable reference class dosimeter for low doses. Where the results of these intercomparisons deviate beyond acceptable limits, the Agency's Dosimetry Laboratory will offer a calibration service for secondary standards. Training will be provided through an annual workshop on dose calibration, on-site training of SSDL staff in the Agency's Dosimetry Laboratory and a regional seminar for Latin America on calibration procedures in SSDLs.

E/48. Expected duration: To date, the Agency has assisted in setting up and operating more than 60 SSDLs, mostly in developing Member States. Support for the network will continue for the foreseeable future.

Project E.3.02

Dose Intercomparison and Assurance

E/49. Objective: To provide dose intercomparison services for radiotherapy in Member States where an SSDL is not available and to provide international dose assurance services for radiation processing facilities.

E/50. Outline of the work planned: The percentage of participating hospitals whose results are acceptable (deviations within the range $\pm 5\%$) has risen from 60% in the 1970s to 70% today. It is planned to extend the service to all radiations and qualities required for radiotherapy and to make use of a human-shaped phantom for patient dose measurements. The capacity of the service will be expanded so that it covers 300 hospitals per year.

E/51. More than 250 gamma and electron high-dose irradiation facilities are in operation in 52 countries - many of them developing ones - and the number of such facilities is growing steadily. Through the International Dose Assurance Service (IDAS) for radiation processing, which was established in 1985, a total of 100 dose checks per year will be conducted for such facilities.

E/52. Expected duration: Continuing.

Project E.3.03

Development of Dosimetry Techniques

E/53. Objective: To develop dosimetry techniques for radiotherapy and to assist in establishing capabilities for reliable dosimetry in radiation processing, particularly in developing countries.

E/54. Outline of the work planned: It is planned in the period 1989-91 to improve the accuracy of absorbed radiation dose delivery through the development and performance testing of new dosimetry systems, the revision of a technical report on the calibration of dosimeters, training courses, regional workshops and some 2-5 country-specific TC projects.

E/55. A technical document on dosimetry for quality control of radiation processing and guidelines on commissioning and routine dosimetry for radiation processing facilities will be prepared in 1989. New high-dose dosimeters (i.e. which are less affected by environmental conditions and which offer a more durable measurement record) will be developed through a CRP (1988-90). A symposium on radiation processing dosimetry is planned for 1990.

E/56. Expected duration: The project will continue for the foreseeable future.

Area of Activity E.4

Nutritional and Health-Related Environmental Studies

Problem I

Lack of capability, especially in developing countries, to assess human nutritional status (with special reference to trace elements, protein and other nutrients) and to assess human exposure to toxic pollutants (Projects E.4.01, E.4.02 and E.4.03).

Project E.4.01

Nuclear Analytical Techniques in Nutritional Research

E/57. Objective: To help establish the use of nuclear analytical methods and isotopic tracers in human nutrition research and to promote their more effective application in the study of relevant nutritional problems in developing countries.

E. HUMAN HEALTH

E/58. Outline of the work planned: The work will focus on three main areas: first, the use of nuclear analytical methods to assess dietary intakes of essential trace elements (such as iron, iodine, selenium and zinc) that are already known to be associated with widespread deficiency diseases in human populations; secondly, applications of stable isotope tracers (deuterium, ^{13}C , ^{15}N , ^{18}O) and other nuclear techniques for the assessment of human energy requirements (which have an important bearing on national and international food and nutrition planning), body composition, protein turnover, etc.; and, thirdly, biochemical measures of nutritional status using nuclear techniques.

E/59. In the first area, analyses of total diet samples from approximately 15 countries will provide data on 24 nutritionally important elements for comparison with the relevant recommended dietary allowances and for input to international and regional data bases such as the INFOODS, EUROFOODS and ASIAFOODS programmes established under the auspices of the United Nations University, and also for an ICRP data base on reference man. This work is expected to be completed in 1989.

E/60. In the second area, up to thirteen stable isotope reference materials will be certified by 1990. A CRP will be conducted on the use of stable isotopes in research on malnutrition (1988-92).

E/61. In the third area, the use of radioisotopes and stable isotope tracers for studies of the speciation and bioavailability of essential micronutrients will be investigated through a CRP (1990-94).

E/62. Expected duration: The project is of a continuing nature, but individual tasks are of finite duration.

Project E.4.02

Nuclear Analytical Techniques in the Monitoring of Health-Related Environmental Pollution

E/63. Objective: To help establish the use of nuclear techniques in health-related environmental studies and to promote their more effective application in developing countries, together with complementary non-nuclear analytical methods, in research on, and monitoring of, non-radioactive environmental pollution.

E/64. Outline of the work planned: Activities will concern the use of nuclear techniques, together with complementary non-nuclear analytical methods, for the determination of toxic elements in foodstuffs, solid wastes (such as coal fly ash) and atmospheric aerosols. Through an existing CRP (1986-90), validation support will be provided to developing countries in monitoring compliance with regulations for toxic elements in foodstuffs and water. Reference analytical methods for the determination of selected key contaminants in total diet samples and in atmospheric aerosols will be developed and published (two publications in 1989 and two in 1990) and a data base of reference materials will be maintained and made available periodically to national laboratories. Nuclear techniques for monitoring toxic elements in solid wastes will be promoted through a CRP (1987-91). A symposium and a seminar will be held in 1989 and two training courses in 1989 and 1990 respectively. With regard to future work in this area, support will be given to national laboratories in connection with environmental specimen banking for monitoring environmental health trends.

E/65. Expected duration: The project is of a continuing nature. As indicated above, certain individual tasks will be completed by 1991.

Project E.4.03

Services to International Pollution Monitoring Programmes

E/66. Objective: To assist Member States and international organizations involved in global pollution monitoring and research programmes by carrying out co-operative activities and providing technical assistance available in the Agency's laboratories.

E/67. Outline of the work planned: This project covers work conducted in the Agency's laboratories in Monaco and Seibersdorf.

E/68. Co-operative work relating to non-radioactive pollution of the sea will be carried out by the Agency's International Laboratory of Marine Radioactivity in conjunction with UNEP, FAO, the Intergovernmental Oceanographic Commission (IOC) of UNESCO, the International Union for the Conservation of Nature and Natural Resources (IUCN), WMO and WHO. The aim will be to develop and improve marine analytical capabilities in Member State institutions through the conduct of intercomparison exercises, the publication of new and revised reference methodologies, the training of scientific and technical staff, the provision of instrument maintenance facilities, and the conduct of specific co-operative research programmes. In principle, the purpose of much of the work is to provide services requested and subsidized by other international organizations.

E/69. The work of the Seibersdorf Laboratory on the analysis of toxic heavy metals and other analytes in rainwater and air filter samples from the Background Air Pollution Monitoring Network (BAPMoN) is expected to continue, in co-operation with WMO, but with a shift in emphasis. Routine "service-type" analyses will be discontinued and replaced by validation support, or "backup analyses" and other quality control services. Fellowship training will be offered.

E/70. Expected duration: The TC aspects of this project are expected to continue well into the 1990s.

PROGRAMME E: HUMAN HEALTH

Summary of main means by Area of Activity for 1989/1990Table 19

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O										
E.1. Nuclear Medicine	RILS	4.3	2.3	-	108 000	-	168 000	-	-	1 699 000	-	1 266 000	-	3 241 000
E.2. Applied Radiation Biology and Radiotherapy	RILS	4.3	2.3	-	39 000	-	31 000	-	-	803 000	-	243 000	-	1 116 000
E.3. Dosimetry	RILS	4.3 [0.2]	3.3 [1.6]	- [0.7]	67 000	-	330 000	-	-	917 000	161 000	682 000	-	2 157 000
E.4. Nutritional and Health-Related Environmental Studies	RILS	2.1 [1.2]	2.1 [4.5]	- [1.1]	40 000	49 000	119 000	-	171 000	1 244 000	190 000	180 000	-	1 993 000
	RIML	1.5	2.0	-	-	-	-	-	-	270 000	-	269 000 a/	-	539 000
Programme E Total		16.5	12.0	-	254 000	49 000	648 000	-	171 000	4 933 000	351 000	2 640 000	-	9 046 000

Note: The manpower figures shown in parentheses above represent the number of man-years of Agency Laboratory staff working for that particular area of activity.

a/ Represents TC-oriented activities conducted by RIML.

PROGRAMME E: HUMAN HEALTH

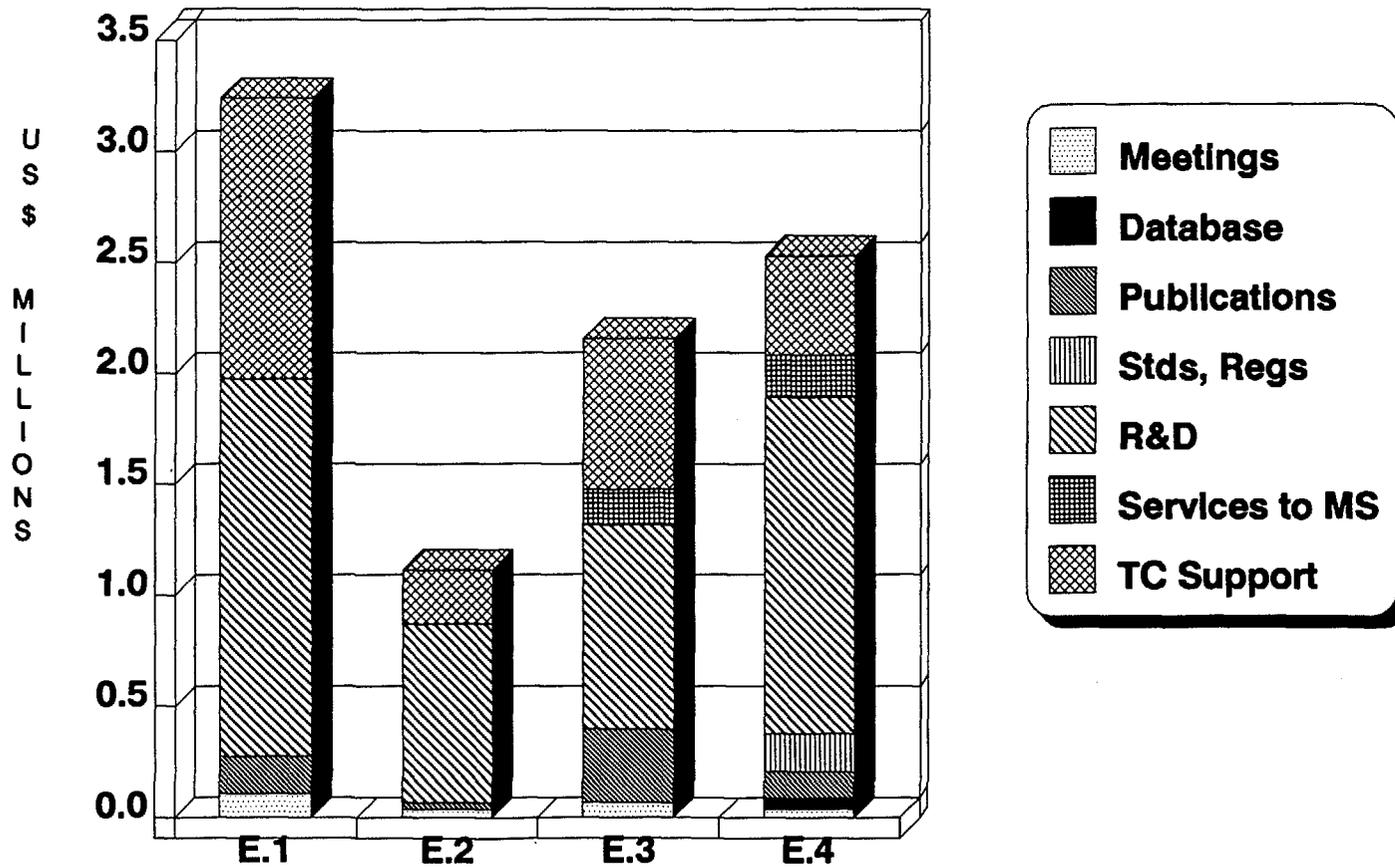
Summary of Regular Budget estimates by Area of ActivityTable 20

Area of Activity / Programme		Respon Div.	1988 Budget	Expenditure increase(decr.) %		1989 at 1988 prices	Expenditure increase(decr.) %		1990 at 1988 prices	Price incr. %	1989 with price incr.	Price incr. %	1990 with price incr.
E.1.	Nuclear Medicine	RILS	1 187 000	313 000	26.4	1 500 000	53 000	3.5	1 553 000	4.1	1 562 000	3.8	1 679 000
E.2.	Applied Radiation Biology and Radio- therapy	RILS	874 000	(307 000)	(35.1)	567 000	(80 000)	(14.1)	487 000	4.1	590 000	3.8	526 000
E.3.	Dosimetry	RILS	1 134 000	(112 000)	(9.9)	1 022 000	(11 000)	(1.1)	1 011 000	4.1	1 064 000	3.8	1 093 000
E.4.	Nutritional and Health- Related Environmental Studies	RILS	943 000	(3 000)	(0.3)	940 000	(1 000)	(0.1)	939 000	4.1	978 000	3.8	1 015 000
		RIML	256 000	(6 000)	(2.3)	250 000	-	-	250 000	5.6	264 000	4.1	275 000
Total - Programme E			4 394 000	(115 000)	(2.6)	4 279 000	(39 000)	(0.9)	4 240 000	4.2	4 458 000	3.8	4 588 000

E. Human Health

Graph 5

Main Means by Area of Activity



Programme E: List of projects and estimated total resources for 1989/1990Table 21

Area of Project Activity Code	Estimated Resources for 1989/1990				
	Regular Budget	Extra- Budgetary a/	TC	Total	
E.1. Nuclear Medicine					
E.1.01 Strengthening Capabilities for In Vitro Assays	669 000	108 000			
E.1.02 Diagnosis of Communicable Diseases	661 000	105 000			
E.1.03 Thyroid Function in Endemic Goitre Areas	134 000				
E.1.04 Development of Indigenous Nuclear Medicine Resources	384 000				
E.1.05 Quality Control and Maintenance of Nuclear Medicine Equipment	765 000				
E.1.06 Dynamic Studies of Organ Function	272 000				
E.1.07 Cost-Effectiveness of Nuclear and Non-Nuclear Procedures for Medical Diagnosis	207 000	200 000			
E.1.08 Early Diagnosis of Cancer by Nuclear Medicine Methods	149 000				
	Sub-total	3 241 000	413 000	5 122 000	8 776 000
E.2. Applied Radiation Biology and Radiotherapy					
E.2.01 Radiation Sterilization of Medical Supplies	672 000				
E.2.02 Fermentation Processing of Cassava	67 000				
E.2.03 Radiotherapy of Cancer of the Cervix	273 000	100 000			
E.2.05 Assistance in Radiotherapy Physics and Clinical Dosimetry	104 000				
	Sub-total	1 116 000	100 000	1 314 000	2 530 000
E.3. Dosimetry					
E.3.01 Secondary Standard Dosimetry Laboratory Network	843 000	20 000			
E.3.02 Dose Intercomparison and Assurance	407 000				
E.3.03 Development of Dosimetry Techniques	907 000	20 000			
	Sub-total	2 157 000	40 000	2 334 000	4 531 000
E.4. Nutritional and Health-related Environmental Studies					
E.4.01 Nuclear Analytical Techniques in Nutritional Research	931 000				
E.4.02 Nuclear Analytical Techniques in the Monitoring of Health-Related Environmental Pollution	790 000				
E.4.03 Services to International Pollution Monitoring Programmes:					
a. Monaco laboratory	539 000	685 000			
b. Seibersdorf laboratory	272 000				
	Sub-total	2 532 000	685 000	200 000	3 417 000
	Total: Programme E - Human Health	9 046 000	1 238 000	8 970 000	19 254 000

a/ Includes funds from other UN organizations.

PROGRAMME F: INDUSTRY AND EARTH SCIENCES

Area of Activity F.1
Industrial Applications

Problem I

In developing countries which have significant industrial capacity, there are gaps in awareness of, and infrastructural capability to use, established radiation and isotope techniques to improve industrial processes (Project F.1.02).

Project F.1.02

Radiation and Isotope Applications in Industry

F/1. Objective: To assess the status of the industrial applications of nuclear techniques and their competitiveness, to provide a forum for the exchange of information on new applications and the improvement of existing techniques, and to promote the transfer of these techniques and technologies to developing Member States.

F/2. Outline of the work planned: Work will be divided into three broad areas: first, the development of technology for environmental protection; secondly, the development of technology for industrial processes; and thirdly, the transfer of technology to developing countries, predominantly through TC activities.

F/3. In the first area, research will be co-ordinated in the period 1988-90 on the radiation processing of flue gases, and in particular on the chemical processes involved and their optimization. Closely associated with this topic will be TC projects involving demonstration-scale and feasibility studies of this technology. Research will also be promoted on tracer techniques for industrial pollutant transport prediction (1989-91) and on the radiation treatment of municipal waste (1988-90). A technical report on the application of nuclear techniques for environmental protection will be drawn up in 1990.

F/4. As regards industrial processes, research will be supported through a CRP on the immobilization of biologically active materials (such as antibodies and enzymes) for medical and industrial applications (1988-90). Also, technical reports will be prepared on the assessment of the economic benefits of industrial tracer applications and on new trends in industrial radiation processing.

F/5. In the third area, activities will mainly involve support for TC projects and training, and the publication of manuals and guidelines. The mechanism of regional TC projects has proven effective and will be expanded. Training manuals will be prepared in support of both Agency and national training courses in this field.

F/6. Expected duration: This is a continuing activity.

Area of Activity F.2
Development of Water and Mineral Resources

Problem I

Serious water resource and utilization problems in many developing countries make it essential to develop and support national and regional capacities for applying proven nuclear techniques in the exploration, assessment and effective use of water (Projects F.2.02, F.2.03 and F.2.04).

Problem II

In developing countries with potential mineral resources, there are gaps in awareness of, and infrastructural capability to use, established nuclear techniques in mineral resource exploration and development (Project F.2.05).

Project F.2.02

Isotopic Methods for Water Resources Assessment

F/7. Objective: To provide a forum for the dissemination of information on, and the assessment of, the use of artificial and environmental isotopes in the development of water and geothermal resources, and to strengthen Member States' ability to use isotope techniques in hydrological investigations.

F/8. Outline of the work planned: Activities will focus on two areas, namely water resources and geothermal resources. Within the limited scope of the development work under this project, research will be promoted, through a CRP, on the development of mathematical models in isotope data evaluation in hydrology with a view to improving the evaluation and prediction of the behaviour of water tracers (1989-91). It is expected that the results will be used to prepare manuals on computer software for such models. Technical documents will be drawn up on artificial isotopes as hydrological tracers (1990), on the application of isotopes in precipitation and surface water studies, including related environmental aspects (1990), and on the application of isotope methods in investigating aquifer vulnerability to pollution (1991). A seminar on isotope applications in geothermics will be held in 1989.

F/9. The bulk of the work under this project will consist of TC activities, involving both field projects and the establishment of isotope hydrology capabilities in Member States. On-the-job training for fellows will be provided by the Agency's Laboratory. It is planned to begin a regional CRP for Asia and the Pacific in 1990 on the application of isotope techniques in geothermics, the primary purpose of which will be technology transfer to the participating countries. Also, support will be provided for a national seminar on isotope techniques in hydrology and geothermics in China in 1989.

F/10. Expected duration: Continuing.

Project F.2.03

Analytical and Intercalibration Services

F/11. Objective: To provide assistance in the determination of the isotope composition of natural waters and in the performance of intercalibration measurements among laboratories.

F/12. Outline of the work planned: Analytical services will continue to be provided by the Agency's Laboratory in connection with TC projects carried out in countries where such analytical facilities are not available.

F/13. In conjunction with WMO and within the framework of the global survey of isotopes in precipitation, isotopic data on precipitation will be produced from samples collected from a global network of stations. These data, which are used to evaluate the isotopic composition of input water in hydrological systems and for climatological studies, are published at intervals of 3-4 years: the next issue is expected to appear in 1989. The Agency has participated in the network for over 25 years. In 1988 it is intended - in conjunction with WMO - to conduct an assessment of the status of the network and its future evolution.

F/14. Expected Duration: Continuing.

Project F.2.04

Study of Water Resources in Africa

F/15. Objective: To strengthen the capability of Member States in Africa, especially those in arid and semi-arid zones, to assess their water resources.

F/16. Outline of the work planned: The project is implemented through some 10 TC projects, including two regional projects on isotope hydrology techniques in the Sahelian countries (involving three countries - Senegal, Mali and Niger) and on water resources in the Nile Valley (Egypt and Sudan). This project should, in principle, end in 1990, but a careful review of its status will be made early in 1990 to determine whether an extension would be desirable.

F/17. A regional seminar for Africa on the application of isotope techniques in hydrology will be organized in 1990 to illustrate the fundamental elements of these techniques and the major results obtained in African countries.

F/18. Expected duration: Until the end of 1990.

Project F.2.05

Development of Mineral Resources

F/19. Objective: To disseminate information on established nuclear techniques used in the exploration, processing or preprocessing of mineral resources, and to assist Member States in assessing the status of such techniques and in establishing the infrastructure for their development.

F/20. Outline of the work planned: CRPs will be conducted on borehole logging techniques for the determination of rock characteristics (1985-89) and on the exploration and exploitation of coal (1989-91). A symposium on nuclear techniques in the exploration and exploitation of energy and mineral resources is planned for 1990.

F/21. Expected duration: The project is continuing in nature.

PROGRAMME F: INDUSTRY AND EARTH SCIENCES

Summary of main means by Area of Activity for 1989/1990Table 22

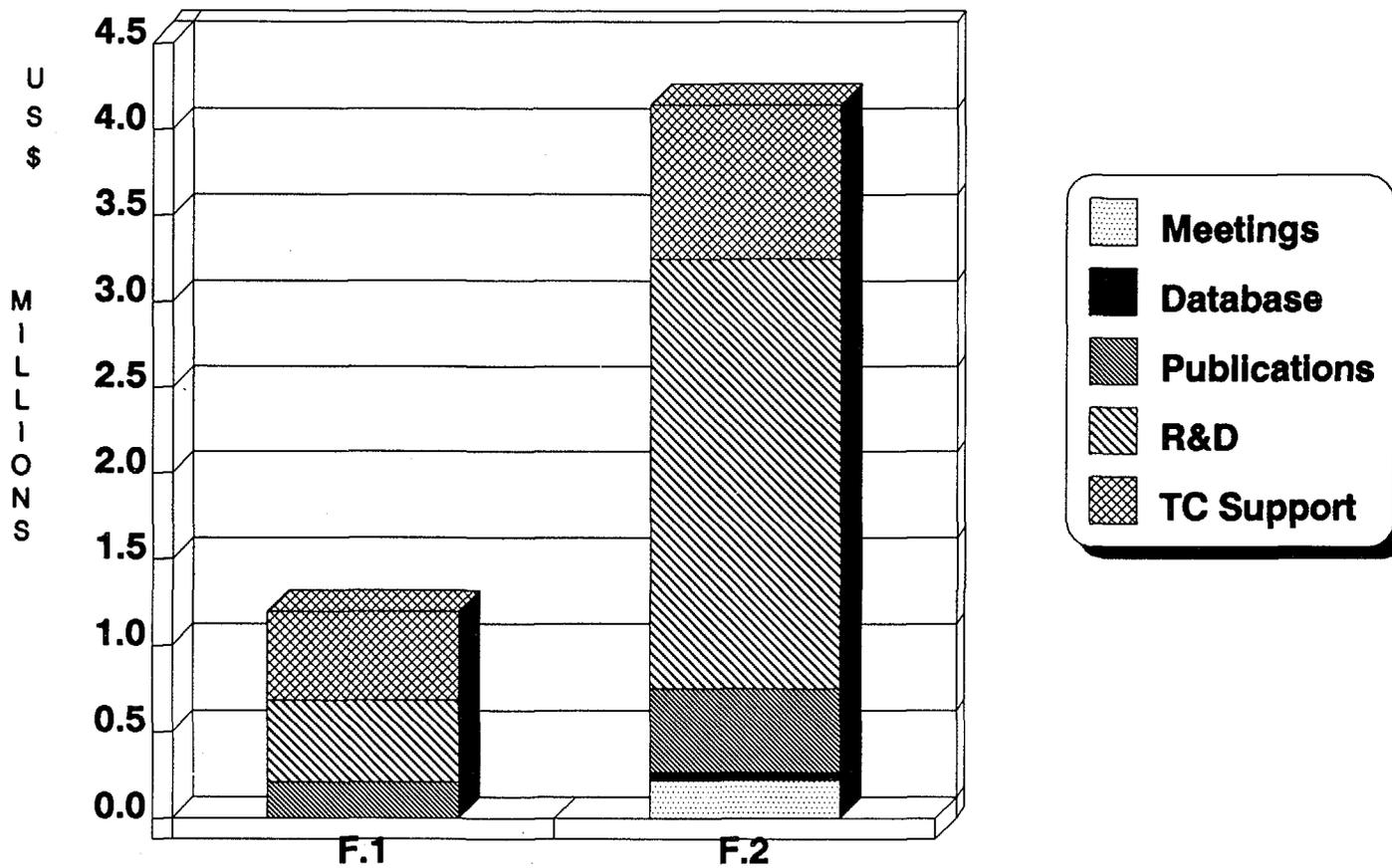
Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O										
F.1. Industrial Applications	RIPC	2.1	1.0	-	-	-	212 000	-	-	470 000	-	514 000	-	1 196 000
F.2. Development of Water and Mineral Resources	RIPC	4.9 [4.0]	3.9 [8.0]	- [1.0]	220 000	48 000	485 000	-	-	2 497 000	-	899 000	-	4 149 000
Programme F Total		7.0	4.9	-	220 000	48 000	697 000	-	-	2 967 000	-	1 413 000	-	5 345 000

Note: The manpower figures shown in parentheses above represent the number of man-years of Agency Laboratory staff working for that particular area of activity.

F. Industry and Earth Sciences

Main Means by Area of Activity

Graph 6



PROGRAMME F: INDUSTRY AND EARTH SCIENCES

Summary of Regular Budget estimates by Area of ActivityTable 23

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure increase(decr.) %	1989 at 1988 prices	Expenditure increase(decr.) %	1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
F.1. Industrial Applications	RIPC	340 000	262 000 77.1	602 000	(82 000) (13.6)	520 000	4.7	630 000	4.0	566 000
F.2. Development of Water and Mineral Resources	RIPC	1 875 000	82 000 4.4	1 957 000	(28 000) (1.4)	1 929 000	4.7	2 049 000	4.0	2 100 000
Total - Programme F		2 215 000	344 000 15.5	2 559 000	(110 000) (4.3)	2 449 000	4.7	2 679 000	4.0	2 666 000

Programme F: List of projects and estimated total resources for 1989/1990Table 24

Area of Project Activity Code	Estimated Resources for 1989/1990			
	Regular Budget	Extra- Budgetary	TC	Total
F.1. Industrial Applications				
F.1.02 Radiation and Isotope Applications in Industry	1 196 000			
Sub-total	1 196 000	-	7 674 000	8 870 000
F.2. Development of Water and Mineral Resources				
F.2.02 Isotopic Methods for Water Resources Assessment	1 499 000	300 000		
F.2.03 Analytical and Intercalibration Services	1 802 000			
F.2.04 Study of Water Resources in Africa	209 000			
F.2.05 Development of Mineral Resources	639 000			
Sub-total	4 149 000	300 000	3 710 000	8 159 000
Total: Programme F - Industry and Earth Sciences	5 345 000	300 000	11 384 000	17 029 000

PROGRAMME G: PHYSICAL AND CHEMICAL SCIENCES

Area of Activity G.1
Nuclear Measurements and Instrumentation

Problem I

The application of various nuclear techniques and the performance of nuclear experiments in many developing countries is hindered by a lack of capacities and capabilities to operate, fully utilize and maintain nuclear instrumentation and to carry out accurate measurements (Projects G.1.01, G.1.05 and G.1.06).

Problem II

Further development in many areas of nuclear technology is affected by a lack of nuclear and atomic data of the required accuracy for certain applications, and - in many developing countries - a lack of ability to utilize existing data (Projects G.1.02, G.1.03 and G.1.04).

Project G.1.01

Nuclear Instrumentation

G/1. Objective: To assist developing countries to strengthen their capabilities regarding the selection, operation and maintenance of equipment and the design and assembly of specific instruments not available on the market.

G/2. Outline of the work planned: The project involves mainly the provision of assistance, including training, through the TC programme. More than half the TC projects in this area involve supplying nuclear instruments and giving advice to universities in developing countries and thus make an important contribution to the development of manpower for all nuclear applications. Three interregional training courses will be held and about 10 national training courses supported. On-the-job training will be provided for eight fellows each year (about 50 man-months) by the Agency's Laboratory. In connection with the above activities, appropriate instruments and methods for training will be developed, resulting in the publication of manuals and the production of instrument kits. Advice will be given on the selection and ordering of nuclear equipment.

G/3. Expected duration: Continuing.

Project G.1.02

Data Assessment and Research Co-ordination

G/4. Objective: To assist Member States in assessing the status of available nuclear and atomic data and in identifying the requirements and the priorities for new and more reliable data for the development of nuclear

technology and nuclear science applications, and to co-ordinate and support the measurement, calculation and evaluation of the improved data required.

G/5. Outline of the work planned: In addition to the continuing aspects of this project, particular emphasis is given to specific data requirements which reflect trends in the growth and development of nuclear technologies. In the 1989-90 period, emphasis will be placed on analysing and fulfilling the needs for improved nuclear and atomic data for nuclear safety (CRP (1987-89) on the evaluation of fission yields); nuclear fusion (CRP (1987-90) on the measurement and analysis of 14 MeV neutron-induced double-differential cross sections, CRP (1987-90) on methods and analysis of neutron emission spectra from (p,n) and (α , n) reactions, CRP (1988-92) on the production of activation cross sections for the generation of long-lived radionuclides, and CRP (1988-91) on the improvement of atomic and molecular data for fusion edge plasma studies); radioisotope production; medical radiotherapy (CRP (1988-91) on atomic and molecular data for radiotherapy, and CRP (1986-90) on nuclear data needed for neutron therapy); radiation damage of nuclear fission and fusion reactor materials (CRP (1986-90) on methods of calculation of fast neutron cross-sections for structural materials); nuclear geophysics applications; and nuclear materials safeguards.

G/6. Expected duration: Continuing.

Project G.1.03

Compilation, Evaluation, Exchange and Validation of Nuclear Data

G/7. Objective: To engage in, and co-ordinate on a worldwide basis, the systematic compilation, analysis, testing and exchange of data with the aim of generating accurate, reliable and up-to-date computer-based collections of nuclear and atomic data.

G/8. Outline of the work planned: The Agency will continue to co-ordinate several networks of national and regional data centres for the systematic worldwide compilation and exchange of nuclear and atomic data and for the development, maintenance and validation of data processing computer programs. Within this scheme, the Agency has responsibility for data originating from developing countries, which it collects, evaluates, stores in computerized files and exchanges with other data centres. During the 1989-90 period, particular emphasis will be given to the build-up of data bases of recommended nuclear reaction and atomic collision data for fusion, and compendia of such data will be published. The total volume of data expected to be available for distribution to Member States in the 1989-90 period will comprise about 100 up-to-date data bases (on magnetic tape) containing close to 1000 megabytes of bibliographic and numerical data.

G/9. Expected duration: Continuing.

G. PHYSICAL AND CHEMICAL SCIENCES

Project G.1.04

Data Centre Services and Technology Transfer

G/10. Objective: To serve as a major international data centre providing extensive nuclear data services, primarily to developing Member States, and to serve as a focal point for the training of scientists in developing Member States in the development, implementation and application of nuclear methods and techniques.

G/11. Outline of the work planned: The Agency has served as a nuclear data centre for over 20 years and will continue to provide numerical and bibliographic data, scientific reports and other documents, and data file processing codes, mainly to developing countries, in response to an expected average number of 700 requests per year.

G/12. Technology transfer activities will be implemented mainly through an interregional TC project on nuclear measurement techniques with the expected participation of more than 50 laboratories in developing countries, and through national TC projects in nuclear sciences and techniques. Two or three training courses on nuclear data technology and applications and on accelerator-based nuclear measurement techniques will be organized during the 1989-90 period.

G/13. Expected duration: Continuing.

Project G.1.05

Nuclear Spectroscopy

G/14. Objective: To improve measurement techniques and methods for nuclear spectroscopy in developing countries.

G/15. Outline of the work planned: It is planned through technical contracts and workshops to develop criteria for equipment selection and to develop measurement approaches. Results will be published in manuals. Software linking nuclear experiments to computers will also be developed. Special attention will be paid to those methods that can be used in applied studies and in small laboratories in developing countries.

G/16. Expected duration: Three years.

Project G.1.06

Nuclear Methods in Materials Research

G/17. Objective: To assess the potential of nuclear techniques and methods in research on the characterization and modification of material properties.

G/18. Outline of the work planned: Studies will be made of contemporary methods for material modification and characterization using such techniques as ion implantation, channelling and Rutherford backscattering.

G/19. Expected duration: Two years.

Area of Activity G.2
Theoretical Physics

Problem I

There is a need to foster, through research and training for research, the advancement of physics and, to a lesser extent, work in applicable mathematics, with special regard to the needs of developing countries so as to encourage scientists from such countries to continue and expand their research work (Project G.2.01).

Project G.2.01

International Centre for Theoretical Physics

G/20. Objective: To foster the growth of advanced studies and research in physical and mathematical sciences and their interface with technology, especially in developing countries, to provide an international forum for scientists from all countries and to provide facilities to enable its visitors, associates and fellows, principally from developing countries, to conduct original research.

G/21. Outline of the work planned: In the period 1989-90, research will continue in fundamental physics, condensed matter physics and applicable mathematics. The Centre's activities in physics and energy will be further developed through four extended courses and three conferences. Work on fundamental physics will continue to receive emphasis: a conference, four workshops and continuing research will be conducted on this topic. The Centre will organize six extended courses and several workshops on physics and high technology with the aim of acquainting scientists from developing countries with this rapidly expanding area and of highlighting the relevance of the physicist to the process of industrial development. A total of six courses will be held on applicable mathematics, and research activities in this field will continue. A number of shorter meetings or other activities will be organized in other areas, including applied physics, astrophysics, physics of the living state, physics of the environment and applicable mathematics. The Centre's fellowship programme in Italian laboratories will be continued, as will support for selected activities in physics and mathematics in developing countries.

G/22. Expected duration: Continuing.

Area of Activity G.3
Utilization of Research Reactors and Particle Accelerators

Problem I

Developing Member States which have installed or are planning to acquire a research reactor often lack the information on how to utilize such facilities optimally to meet real national needs (Projects G.3.01 and G.3.02).

Project G.3.01

Research Reactor Core Conversion

G/23. Objective: To assist research reactor owners in Member States to establish programmes for, and to convert their reactors to, the use of low-enriched uranium (LEU) fuels.

G/24. Outline of the work planned: To date, reports have been published on the technical feasibility of converting light-water moderated and heavy-water moderated research reactors to LEU, on preoperational and startup procedures for core conversion and on safety and licensing issues relating to core conversion.

G/25. In the period 1989-90, it is planned to prepare a technical document on core conversion of specific reactor types. Reactor physicists will receive training in calculations, using main frame and small computers.

G/26. Expected duration: The project will be completed in 1990.

Project G.3.02

Utilization of Research Reactors and Particle Accelerators

G/27. Objective: To increase the utilization of research reactors and particle accelerators in Member States and to assist users in developing and implementing utilization programmes.

G/28. Outline of the work planned: The Agency's research reactor data base, which was computerized in 1984, will continue to be maintained and updated; a user's guide for this system has been published. A technical document (first issued in 1986) listing the nuclear research reactors in the world will be updated periodically.

G/29. The major effort in this project is providing support for TC projects, many of which relate to the establishment of new research reactor facilities and associated utilization laboratories.

G/30. Expected duration: Continuing.

Area of Activity G.4
Chemistry

Problem I

Developing countries in which the market is sufficiently large to justify the local production of radioisotopes and radiopharmaceuticals lack the capabilities in radiochemistry required to achieve this and to implement adequate quality control (Project G.4.01).

Problem II

Many developing countries have difficulty in establishing adequate capabilities, in terms of accuracy and precision, to perform much needed reliable chemical and nuclear analyses in mineral exploration, environmental control, nutrition and industry (Project G.4.02).

Project G.4.01Radioisotope and Radiopharmaceutical Production

G/31. Objective: To assist laboratories in developing Member States to improve their ability to develop an infrastructure - particularly as regards quality control - for the preparation of radiopharmaceuticals and radioisotopes.

G/32. Outline of the work planned: The project will deal both with the development of new technologies and with technology transfer. In the former area, research will be co-ordinated on radioisotope labelling techniques for monoclonal antibodies (1989-91) and on technology for the production of $^{99}\text{Tc}^{\text{m}}$ generators. The first stage of work on such generators was conducted through a CRP which is ending in 1988, and it is planned in 1989 to initiate a new three-year programme aimed at investigating further alternative technologies for $^{99}\text{Tc}^{\text{m}}$ generators.

G/33. In technology transfer, which will be implemented mainly through TC projects and training as well as the preparation of manuals, it is expected that attention will focus on technetium production and improved quality control methods in radiopharmaceutical production.

G/34. Expected duration: The TC component of this project is continuing in nature.

Project G.4.02Nuclear Analytical Chemistry

G/35. Objective: To assist laboratories in Member States to provide higher-quality nuclear analytical chemistry services.

G/36. Outline of the work planned: Under the regional programme for Latin America (ARCAL), research will be promoted through a CRP on nuclear analytical techniques for trace element analyses in agro-industrial products, with emphasis on toxic and nutritional elements (1987-90).

G/37. The Agency's Laboratory will continue to run a programme of analytical quality control intercomparisons for the determination of minor and trace elements and radioactivity in different materials of environmental interest. It is expected that 8-10 such intercomparisons (each involving 40-90 institutes) will be performed and that 80-100 reference materials will be prepared and distributed.

G/38. A major element of the project relates to technology transfer through TC projects, including training.

G/39. Expected duration: The TC component is continuing in nature.

PROGRAMME G: PHYSICAL AND CHEMICAL SCIENCES

Summary of main means by Area of Activity for 1989/1990Table 25

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O										
G.1. Nuclear Measurements and Instrumentation	RIPC	14.6 [2.5]	10.9 [10.1]	- [2.4]	-	2 467 000	827 000	-	-	1 104 000	204 000	3 104 000	-	7 706 000
G.2. Theoretical Physics	RITP	11.0	25.0	-	883 000	-	254 000	-	-	332 000	-	1 118 000 a/	-	2 587 000
G.3. Utilization of Research Reactors and Particle Accelerators	RIPC	1.0	0.5	-	40 000	122 000	314 000	-	-	555 000	40 000	661 000	-	1 732 000
G.4. Chemistry	RIPC	2.2 [2.2]	0.6 [3.5]	- [1.1]	-	-	68 000	-	-	1 466 000	-	295 000	-	1 829 000
Programme G Total		28.8	37.0	-	923 000	2 589 000	1 463 000	-	-	3 457 000	244 000	5 178 000	-	13 854 000

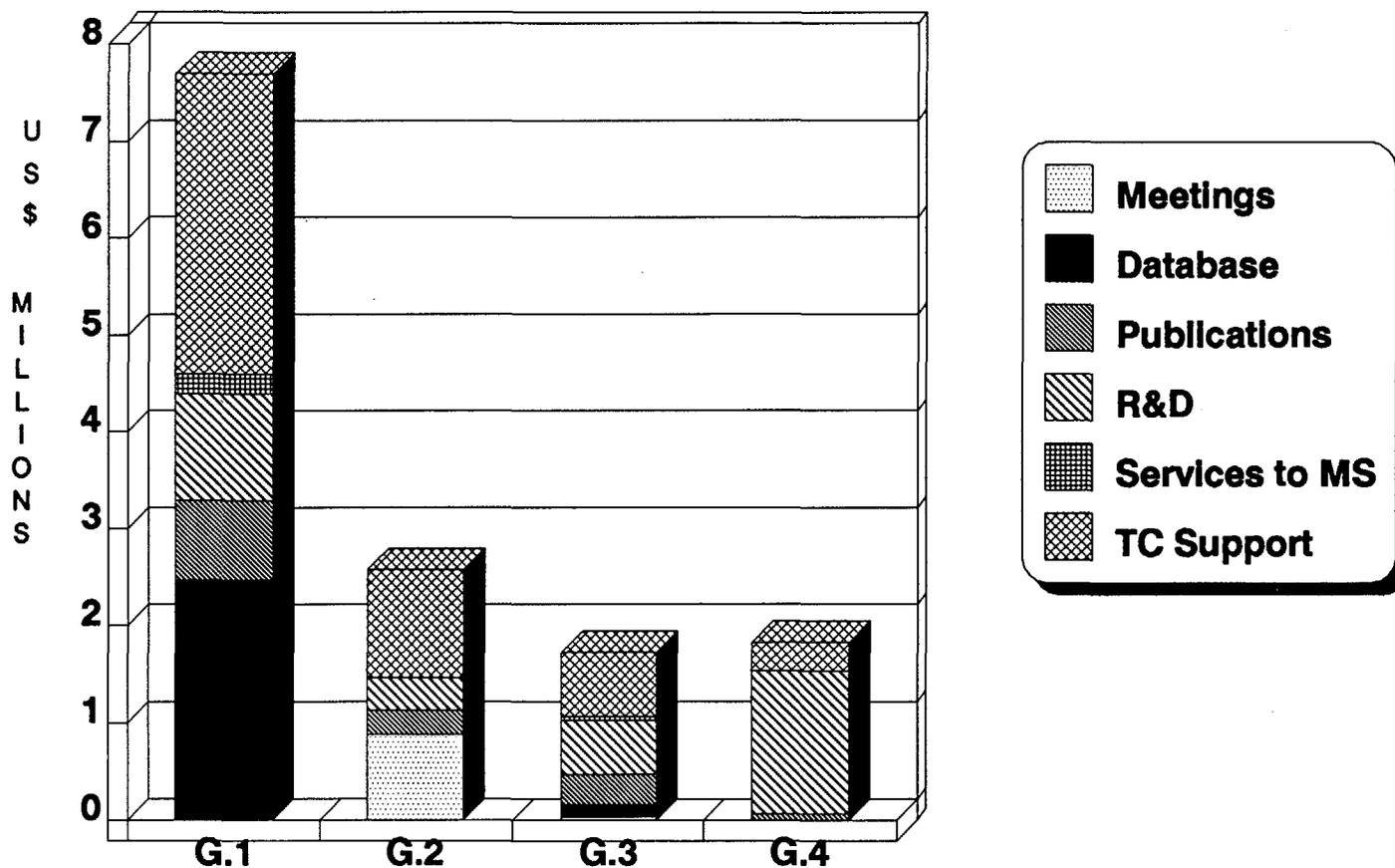
Note: The manpower figures shown in parentheses above represent the number of man-years of Agency Laboratory staff working for that particular area of activity.

a/ Represents TC-oriented activities conducted by the Centre.

G. Physical and Chemical Sciences

Main Means by Area of Activity

Graph 7



PROGRAMME G: PHYSICAL AND CHEMICAL SCIENCES

Summary of Regular Budget estimates by Area of ActivityTable 26

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure increase(decr.) %		1989 at 1988 prices	Expenditure increase(decr.) %		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
G.1. Nuclear Measurements and Instrumentation	RIPC	3 638 000	(21 000)	(0.6)	3 617 000	(18 000)	(0.5)	3 599 000	4.7	3 787 000	4.0	3 919 000
G.2. Theoretical Physics	RITP	1 262 000	(61 000)	(4.8)	1 201 000	-	-	1 201 000	5.1	1 262 000	5.0	1 325 000
G.3. Utilization of Research Reactors and Particle Accelerators	RIPC	819 000	37 000	4.5	856 000	(89 000)	(10.4)	767 000	4.7	897 000	4.0	835 000
G.4. Chemistry	RIPC	1 158 000	(323 000)	(27.9)	835 000	41 000	4.9	876 000	4.7	875 000	4.0	954 000
Total - Programme G		6 877 000	(368 000)	(5.4)	6 509 000	(66 000)	(1.0)	6 443 000	4.8	6 821 000	4.2	7 033 000

Programme G: List of projects and estimated total resources for 1989/1990Table 27

Area of Project Activity Code	Estimated Resources for 1989/1990			
	Regular Budget	Extra- Budgetary a/	TC	Total
G.1. Nuclear Measurements and Instrumentation				
G.1.01 Nuclear Instrumentation	1 744 000			
G.1.02 Data Assessment and Research Co-ordination	1 969 000			
G.1.03 Compilation, Evaluation, Exchange and Validation of Nuclear Data	1 996 000			
G.1.04 Data Centre Services and Technology Transfer	887 000			
G.1.05 Nuclear Spectroscopy	749 000			
G.1.06 Nuclear Methods in Materials Research	361 000			
Sub-total	7 706 000	-	6 916 000	14 622 000
G.2. Theoretical Physics				
G.2.01 International Centre for Theoretical Physics	2 587 000	27 938 000		
Sub-total	2 587 000	27 938 000	-	30 525 000
G.3. Utilization of Research Reactors and Particle Accelerators				
G.3.01 Research Reactor Core Conversion	955 000			
G.3.02 Utilization of Research Reactors and Particle Accelerators	777 000	185 000		
Sub-total	1 732 000	185 000	3 654 000	5 571 000
G.4. Chemistry				
G.4.01 Radioisotope and Radiopharmaceutical Production	381 000			
G.4.02 Nuclear Analytical Chemistry	1 448 000			
Sub-total	1 829 000	-	7 712 000	9 541 000
Total: Programme G - Physical and Chemical Sciences	13 854 000	28 123 000	18 282 000	60 259 000

a/ Includes funds from other UN organizations.

PROGRAMME AREA 3

NUCLEAR SAFETY AND RADIATION PROTECTION

NUCLEAR SAFETY AND RADIATION PROTECTION

Summary of total resources by programme

Table 28

Programme	Man-years (Per Year)			Planned expenditure for programme implementation in 1989/1990				
	P	GS	M&O	Regular Budget estimates	Funds from other UN organizations	TC resources	Other extra- budgetary resources	Total
H. Radiation Protection	16.2	12.2	-	8 699 000	-	7 152 000	644 000	16 495 000
I. Safety of Nuclear Installations	21.8	13.8	-	10 821 000	-	4 582 000	450 000	15 853 000
Programme Area 3	38.0	26.0	-	19 520 000	-	11 734 000	1 094 000	32 348 000

PROGRAMME H: RADIATION PROTECTION

Area of Activity H.1
Basic Principles and CriteriaProblem I

In order to fulfil its statutory role, the Agency establishes standards and guidance on radiation protection derived from basic recommendations which are formulated and periodically revised by the International Commission on Radiological Protection (ICRP) and which are intended to cover the planning of radiation protection for situations that can be anticipated. These take the form of the Basic Safety Standards for Radiation Protection (BSS) and can be used by all Member States as the basis for national regulations (Project H.1.01).

Problem II

There exist situations involving radiation exposure which cannot be anticipated and to which the full system of dose limitation prescribed in the BSS does not apply. The radiation protection principles that should apply to such "de facto" situations need to be developed on a generic basis for application to specific situations. One crucial issue in this regard is the establishment of a coherent and consistent set of internationally recognized intervention levels for dealing with any large-scale unanticipated contamination (Project H.1.02).

Problem III

Developing countries which have significant applications of radiation need to strengthen their infrastructure for radiation protection in order to facilitate the further expansion of safe and effective applications of nuclear energy (Project H.1.03).

Project H.1.01Basic Radiation Protection Criteria for Anticipated Situations

H/1. Objective: To maintain an effective exchange of technical information by collecting, reviewing and disseminating data on current radiation protection issues and to provide basic radiation protection criteria for anticipated situations as a basis for the establishment by national authorities of radiation protection regulations and licensing and inspection procedures in order to minimize the danger to life and property from the use of ionizing radiation.

H/2. Outline of the work planned: Safety standards will be prepared on principles for exempting radioactive substances, equipment and sources from the requirements of the BSS.

H/3. Following extensive consultations with Member States and relevant national and international organizations, a safety guide will be drawn up on the extension of the principles of radiation protection to sources of potential exposure.

H. RADIATION PROTECTION

H/4. Preliminary work on a comprehensive revision of the BSS (foreseen for 1993) will begin with the publication in 1990 of a technical document identifying the basic issues requiring updating. A symposium to review experience regarding radiation protection infrastructures is planned for 1990.

H/5. The Agency will continue to support the work of the ICRP and to participate in its activities. Co-operation will also be maintained with WHO, ILO, FAO, OECD/NEA, CEC and CMEA.

H/6. Expected duration: Continuing.

Project H.1.02

Basic Radiation Protection Criteria for Unanticipated Situations

H/7. Objective: To develop basic radiation protection criteria for unanticipated situations involving radiation exposures to which the full BSS system of dose limitation does not apply and to prepare a set of internationally recognized intervention levels for dealing with any large-scale unanticipated contamination.

H/8. Outline of the work planned: In the period 1989-1990, it is planned to review existing guidance for unanticipated ("de facto") sources of exposure, which relate to doses that may be incurred under post-accident conditions or are due to high natural background levels. As a result of this review, radiation protection criteria offering a more generic approach to such exposure conditions will be established and guidance on their practical implementation will be prepared.

H/9. A revision of the existing safety documents (Safety Series No. 72 and 81) on the principles for establishing intervention levels and derived intervention levels for the protection of the public in the event of a nuclear accident or radiological emergency will be undertaken in 1989.

H/10. Expected duration: The project will be completed in 1991.

Project H.1.03

Strengthening Radiation Protection Infrastructures

H/11. Objective: To help Member States in organizing or strengthening infrastructures to meet their nuclear safety and radiation protection needs and responsibilities.

H/12. Outline of the work planned: The work will be divided into five main areas: first, the establishment of regulations; second, general information exchange; third, promotion of research and development; fourth, the provision of training and support for country-specific TC activities; and fifth, the provision of Radiation Protection Advisory Teams (RAPATs). The activities under this project will be implemented in conjunction with the "Safety of Nuclear Installations" programme (Project I.1.02).

H/13. It is intended to review the radiation protection documents issued by the Agency in its safety series with a view to creating a systematic and comprehensive system of regulations for radiation protection governing Agency operations. The system will be mandatory for the Agency's own operations as well as for operations making use of materials, services, equipment, facilities and information made available by the Agency or at its request or under its control or supervision. These regulations will also be used as the basis for strengthening radiation protection infrastructures in Member States.

H/14. A repository of information on severe radiation accidents will be initiated with the publication of a review of the Goiania accident. Country files with all relevant information on radiation safety will be maintained.

H/15. A review of the research and development work on radiation protection and nuclear safety sponsored by the Agency will be conducted and the status and desired trends in this area will be examined. The results of Agency-sponsored research on radiation protection and safety will be published periodically in a technical report.

H/16. A meeting of experts will be organized to identify priority topics for training courses in radiation protection and nuclear safety and to review the syllabuses for the courses planned, the results being published in a technical document.

H/17. Two or three general training courses are planned each year, and a regional seminar on regulatory aspects and the enforcement of radiation protection will be held in 1989.

H/18. Increased support will be given to the execution of regional technical co-operation projects in Latin America (ARCAL) and the Pacific and Far East (RCA), and the experience gained there will be extended to new regional projects in the Middle East and in Africa. These projects aim at strengthening technical co-operation with and among countries of one region experiencing similar problems.

H/19. In addition, more attention will be paid to implementing the recommendations of RAPAT missions, of which 12 will be carried out each year. A critical review of the assistance provided to Member States in the radiation protection and nuclear safety field will be undertaken with a view to developing a more systematic approach to such activities. Country-specific files will be established in this connection.

H/20. Certain services which are provided to Member States by the Agency's "Radiation Protection Service", whose main function is the in-house monitoring of the Agency's radiation workers, are described under Project S.5.3.

H/21. Expected duration: This is a continuing activity.

Area of Activity H.2
Occupational Radiation Protection

Problem I

While the principles for occupational radiation protection derived from the BSS provide a basis for the development of national radiation protection systems, more detailed technical guidance and direct assistance are necessary for the practical application of these principles (Projects H.2.01 and H.2.02).

Project H.2.01

Guidelines for Radiation Protection in Design and Operations

H/22. Objective: To formulate internationally harmonized and agreed guidelines on principles governing the design of radiation protection systems and to operational radiation protection at workplaces and to assist Member States in their implementation.

H/23. Outline of the work planned: Following a major revision of the ICRP's recommendations in 1977, the Agency issued (jointly with ILO, WHO and OECD/NEA) revised BSS in 1982. Subsequently, a programme was initiated to complement these general standards with more detailed guides on the design of radiation protection systems and operational radiation protection.

H/24. By 1988 the first phase of the project will have been completed and a number of documents will have been produced on radiation protection principles for the above areas. In the follow-up phase which will commence in 1989, more detailed technical guidance for the practical application of these principles will be prepared. This will take the form of methodology guidelines. It is envisaged that ten documents will be drawn up annually, the aim being to prepare a collection of 50 concise guides over a period of five years (1989-1993). This work will be undertaken in co-operation with ILO and WHO.

H/25. In addition, a safety guide on the design of radiation protection systems and a safety manual on protective clothing for personnel involved in operations in the presence of very high levels of contamination will be issued in 1990.

H/26. Expected duration: 1989 to 1995.

Project H.2.02

Guidelines for Occupational Monitoring

H/27. Objective: To formulate internationally harmonized and agreed guidelines on principles for monitoring workers exposed to radiation as a result of their work and for monitoring their working environment, and to provide direct assistance to Member States in their application.

H/28. Outline of the work planned: In the period 1989-90, a safety guide on the minimum requirements for personnel monitoring and a technical document on

beta and gamma spectra and detector responses for radiation protection purposes will be prepared. In addition, an intercomparison exercise will be conducted within the framework of a CRP with a view to improving the accuracy with which occupational radiation doses are monitored (1987-91).

H/29. A data base on occupational radiation exposure statistics will be established for use as a performance indicator of occupational radiation protection practices.

H/30. Direct assistance with the establishment of appropriate occupational monitoring will be provided through training courses and TC projects.

H/31. Expected duration: Continuing.

Area of Activity H.3
Environmental Assessment and Protection

Problem I

The BSS require that practices involving the radiation exposure of members of the public comply with the requirements of the system of dose limitation. To implement these requirements, it is desirable to establish internationally agreed guidelines for the limitation of such releases (Project H.3.01).

Problem II

The management of installations releasing radioactive substances to the environment must demonstrate compliance with authorized release limits. To do so, the radioactive substances released must be adequately monitored and accounted for. It is therefore desirable to establish internationally agreed guidelines for the monitoring of such releases as well as to strengthen the capacity and infrastructure for the determination of contamination in the environment and food resulting from radioactive releases to the environment (Projects H.3.02 and H.3.03).

Project H.3.01

Guidelines on the Limitation of Releases to the Environment

H/32. Objective: To elaborate and provide to Member States a comprehensive set of internationally recognized recommendations on the limitation of releases of radioactive effluents into the environment and on the establishment of source upper bounds.

H/33. Outline of the work planned: A total of 10 technical documents will have been published by the end of 1988 under this project following the publication of the revised BSS in 1982. It is planned in the period 1989-91 to prepare safety guides on the principles for limiting releases of

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radioactive effluents for nuclear facilities and on methods for assessing individual and collective dose in connection with the limitation of such releases (in co-operation with the "Radioactive Waste Management" programme). A technical document establishing source upper bounds for specific practices will be issued in 1990.

H/34. Expected duration: The current phase will continue until 1992.

Project H.3.02

Environmental Monitoring

H/35. Objective: To elaborate and provide to Member States a comprehensive set of internationally recognized recommendations on the monitoring of the environment for the purpose of the radiation protection of the general public and to assist Member States in their implementation.

H/36. Outline of the work planned: Efforts will concentrate on two areas; first, environmental monitoring; and second, the assessment of the results of post-accident environmental measurements.

H/37. In the first area, the main focus will be on the monitoring and assessment of environmental radioactivity in general and of foodstuff contamination resulting from a major accident. A safety guide will be prepared and a symposium held in this connection.

H/38. Through TC projects, assistance will be given to Member States in the establishment or improvement of capabilities for environmental radiation monitoring.

H/39. In the second area, a validation and intercalibration study will be made of models for the atmospheric transport of radionuclides (jointly with WMO). A CRP on the validation of models for the transport of radionuclides in the terrestrial, aquatic and urban environments will be carried out from 1988 to 1992 (in conjunction with the "Radioactive Waste Management" programme). A data base for use in assessing the radiological impact of a severe nuclear accident will be maintained and expanded. A safety manual will be prepared on the need to alleviate the longer-term adverse effects of accidental releases, particularly into the agricultural environment.

H/40. Expected duration: Continuing.

Project H.3.03

Measurement of Accidentally Released Radionuclides in Environmental and Food Samples

H/41. Objective: To help improve capabilities, particularly in developing countries, for the reliable assessment of accidentally released radionuclides in environmental and food samples.

H/42. Outline of the work planned: Attention will focus on the preparation of technical documents describing modern and well-validated methods for assessing the levels of radionuclides in environmental and food samples

(covering identification of key samples and radionuclides, sampling, sample preparation, instrumentation, measurement procedures, data evaluation, quality control procedures and reference materials). Research will be co-ordinated on rapid radiochemical separation procedures for those radionuclides that cannot be determined directly by purely instrumental means. Fellowship training, training courses, TC support and advisory services will be offered. During the period 1989-90, one or two new food-based reference materials containing low activities of relevant radionuclides will be certified on the basis of intercomparisons conducted during 1988-90.

H/43. Expected duration: This is a new project which was initiated under the supplementary nuclear safety programme and is expected to end in 1991. TC and quality control services are expected to continue well into the 1990s.

Area of Activity H.4
Safe Transport of Radioactive Materials

Problem I

Changing transport conditions and new developments in safety and radiation protection require that the Agency's Regulations for the Safe Transport of Radioactive Material be kept under review and periodically updated, as they are the basis for regulatory control documents issued by international regulatory organizations and Member States (Projects H.4.01 and H.4.02).

Project H.4.01

Maintenance of the Transport Regulations

H/44. Objective: To maintain, review and revise the Regulations for the Safe Transport of Radioactive Materials and their supporting documents to ensure their adequacy in the light of changes in transport conditions, the needs of Member States and international organizations, and radiological protection and general safety practices.

H/45. Outline of the work planned: The Regulations for the Safe Transport of Radioactive Material (Safety Series No. 6) and the supporting documents will continue to be reviewed and updated. A supplementary document containing all necessary amendments to Safety Series No. 6 and its supporting documents will be published in 1990. Aspects to which particular attention will be paid are high-consequence, low-probability transport accidents, optimization in transport safety and regulatory provisions for uranium hexafluoride and other substances with significant subsidiary risks.

H/46. Expected duration: The current phase of review of the regulations will end in 1992.

Project H.4.02

Implementation of the Transport Regulations

H/47. Objective: To assist Member States and international organizations in the proper implementation of the transport regulations and their supporting documents.

H/48. Outline of the work planned: Data bases containing information on national competent authorities and their approval certificates, on transport accidents and incidents and on the shipment of radioactive materials will be maintained and the information made available to Member States.

H/49. A computer code for assessing radiation exposure in transport will be further developed.

H/50. The Agency will continue to liaise with, and participate in the work of, other international transport regulatory bodies.

H/51. Expected duration: Continuing.

Area of Activity H.5
Emergency Planning and Preparedness

Problem I

Member States need guidance on the establishment of viable emergency plans and emergency preparedness infrastructures capable of responding effectively to a serious nuclear accident or radiological emergency (Project H.5.01).

Problem II

Member States may require assistance in developing and strengthening their emergency response arrangements in order - inter alia - to fully meet their obligations under the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Project H.5.02).

Problem III

Under the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, the Agency is required to discharge specific responsibilities (Project H.5.03).

Project H.5.01Development of Guidelines for Emergency Planning and Preparedness

H/52. Objective: To formulate and update a comprehensive set of internationally recognized technical guides on emergency planning and preparedness for nuclear installations and other installations containing radioactive materials.

H/53. Outline of the work planned: A total of 21 technical guidance documents will have been completed by the end of 1988. Technical reports will be prepared in 1989-90 dealing with fire-fighting in a radiation environment and the effectiveness of evacuation and sheltering measures after a nuclear accident. Safety guides will be drawn up on emergency planning and preparedness for radiological accidents at fuel cycle facilities and at research reactors, and on the control of emergency workers under accident conditions at a nuclear facility. A seminar on recovery operations and clean-up in the event of a nuclear power plant accident will be organized in 1989.

H/54. Expected duration: After 1990 the emphasis under this project will be on reviewing and updating existing guidance documents to keep abreast of new technology.

Project H.5.02Implementation of Guidelines for Emergency Planning and Preparedness

H/55. Objective: To provide direct assistance to Member States in emergency planning and preparedness.

H/56. Outline of the work planned: The project will be carried out predominantly through training and advisory missions conducted under the TC programme. An interregional training course on planning, preparedness and response to nuclear accidents or radiological emergencies is foreseen for 1989. Annual regional courses on emergency planning and preparedness are also planned, and support will be given to national training courses.

H/57. Expected duration: Assistance in improving emergency planning and preparedness infrastructures is a continuing activity.

Project H.5.03Emergency Assistance Services

H/58. Objective: To maintain the Agency's emergency response capability and its co-operative arrangements with Member States and States parties to the Early Notification and Emergency Assistance Conventions.

H/59. Outline of the work planned: The Agency will maintain its capability with respect to plans, procedures and in-house organizational infrastructure in connection with the Conventions. A technical document informing Member States and other international organizations of the Agency's revised emergency response and assistance arrangements will be prepared in 1989. A safety

H. RADIATION PROTECTION

manual relating to the implementation of both Conventions will also be prepared.

H/60. An emergency assistance resource data base will be established in 1990 and software for handling radiological monitoring results under accident conditions will be completed in the same year.

H/61. Expected duration: Maintaining an emergency response capability is a continuing commitment under the Conventions.

Area of Activity H.6 Control of Radiation Sources

Problem I

Virtually all Member States use radiation sources for industrial, medical, research and educational purposes. Lack of adequate control and regulation of such sources and inappropriate usage and handling can result in significant radiation exposures to workers and members of the public, sometimes with fatal results. It is desirable to formulate internationally harmonized and agreed guidelines for such control and regulations (Project H.6.01).

Project H.6.01

Safe Use and Control of Radiation Sources

H/62. Objective: To formulate internationally harmonized and agreed guidance on the safe handling of radiation sources used in industry, medicine, research and teaching and to assist Member States with their implementation.

H/63. Outline of the work planned: In the period 1989-90, guidance will be prepared on the safe handling of radiation sources both for users and for regulatory authorities and senior management. For users, a set of technical information documents will be drawn up containing easily understood guidance on the safe operation of sources in such areas as field industrial radiography, radiotherapy and nuclear medicine (in particular $^{99}\text{Tc}^{\text{m}}$). With regard to regulatory authorities and senior management, a number of safety series documents on the safe handling of radioisotopes in hydrology and industrial processes will be reviewed and updated. A manual on radiation protection in hospitals and general practice will also be revised.

H/64. In co-operation with the "Radioactive Waste Management" programme, meetings with producers of radiation sources and regulatory authorities in producer countries will be arranged with a view to reaching an agreement on the notification of recipient States when certain categories of sources are

exported and on possible arrangements for the return of used radiation sources to the supplier country or a third party. Directories of radiation sources for industrial and medical use will also be prepared.

H/65. The detailed activities planned under this new project will be reviewed by a group of experts scheduled for 1988.

H/66. Expected duration: 1989-1995.

Area of Activity H.7
Radiation Safety of Nuclear Fuel-Related Activities

Problem I

Member States need international guidance on harmonized standards and procedures for dealing with radiation protection and safety issues relating specifically to nuclear fuel-related activities (Project H.7.01).

Project H.7.01

Guidelines on the Radiation Safety of Nuclear Fuel-Related Facilities

H/67. Objective: To develop a comprehensive set of internationally agreed recommendations on the radiation safety of nuclear fuel-related facilities.

H/68. Outline of the work planned: Activities will cover the radiation safety of mining and milling, fuel fabrication and waste disposal facilities and will be carried out in close co-operation with the "Nuclear Fuel Cycle" programme.

H/69. A thorough review will be undertaken of the work done so far by the Agency in this field with a view to identifying areas where information is lacking and aspects where revision is required. Safety standards for mining and milling and hexafluoride production and fuel fabrication will be prepared in the period 1989-91. Work on a safety guide dealing with radiation protection principles for the disposal of solid radioactive wastes will begin in 1990.

H/70. Expected duration: The initial phase of the project will continue until 1994.

H. RADIATION PROTECTION

Area of Activity H.8 Exposure Assessment and Handling

Problem I

International guidance is needed for monitoring the intake of radioactive materials and assessing the resultant internal doses, and in particular for the dose-per-unit-intake factors to be used in assessing the radiation dose received by members of the public subjected to the incorporation of radioactive materials (Project H.8.01).

Problem II

Member States need guidance on adequate measures to minimize - through proper handling - the health consequences of radiation overexposure (Project H.8.02).

Project H.8.01

Guidelines for the Monitoring of Intakes of Radioactive Materials and the Assessment of Internal Doses

H/71. Objective: To provide recommendations on internal dosimetry and to establish the factors needed to assess the dose-per-unit-intake for individual members of the public.

H/72. Outline of the work planned: During the period 1989-1990, it is intended to prepare detailed technical guidance on the assessment of internal doses resulting from various radionuclides incorporated into the body and on the monitoring of internal contamination, including direct and indirect methods of measuring whole body (organ) burden. A technical report containing guidance on how to monitor large groups of internally contaminated people in abnormal situations will be published in 1990.

H/73. A CRP on dose-per-unit-intake factors for various groups of people and for selected radionuclides will be concluded in 1990 and the results will provide the basis for a standards document in 1991.

H/74. Expected duration: The phase of the project initiated in 1988 will continue until 1991.

Project H.8.02

Guidelines for the Diagnosis, Prognosis and Treatment of Individuals Exposed to Radiation

H/75. Objective: To formulate, update and provide to Member States internationally recognized recommendations on medical aspects of radiation protection and to encourage the development of biological methods of dose assessment in individuals affected by accidental over-exposures.

H/76. Outline of the work planned: The project was initiated in 1984, and by 1991 a set of documents will have been published on the medical handling of accidentally exposed individuals, dealing in particular with the problems of external irradiation, external and internal contamination and handling of skin lesions. Three of these documents will be prepared in the period 1989-90. A CRP on biological dosimetry and evaluation will be carried out from 1989 to 1991.

H/77. Expected duration: The project will be completed in 1991.

PROGRAMME H: RADIATION PROTECTION

Summary of main means by Area of Activity for 1989/1990

Table 29

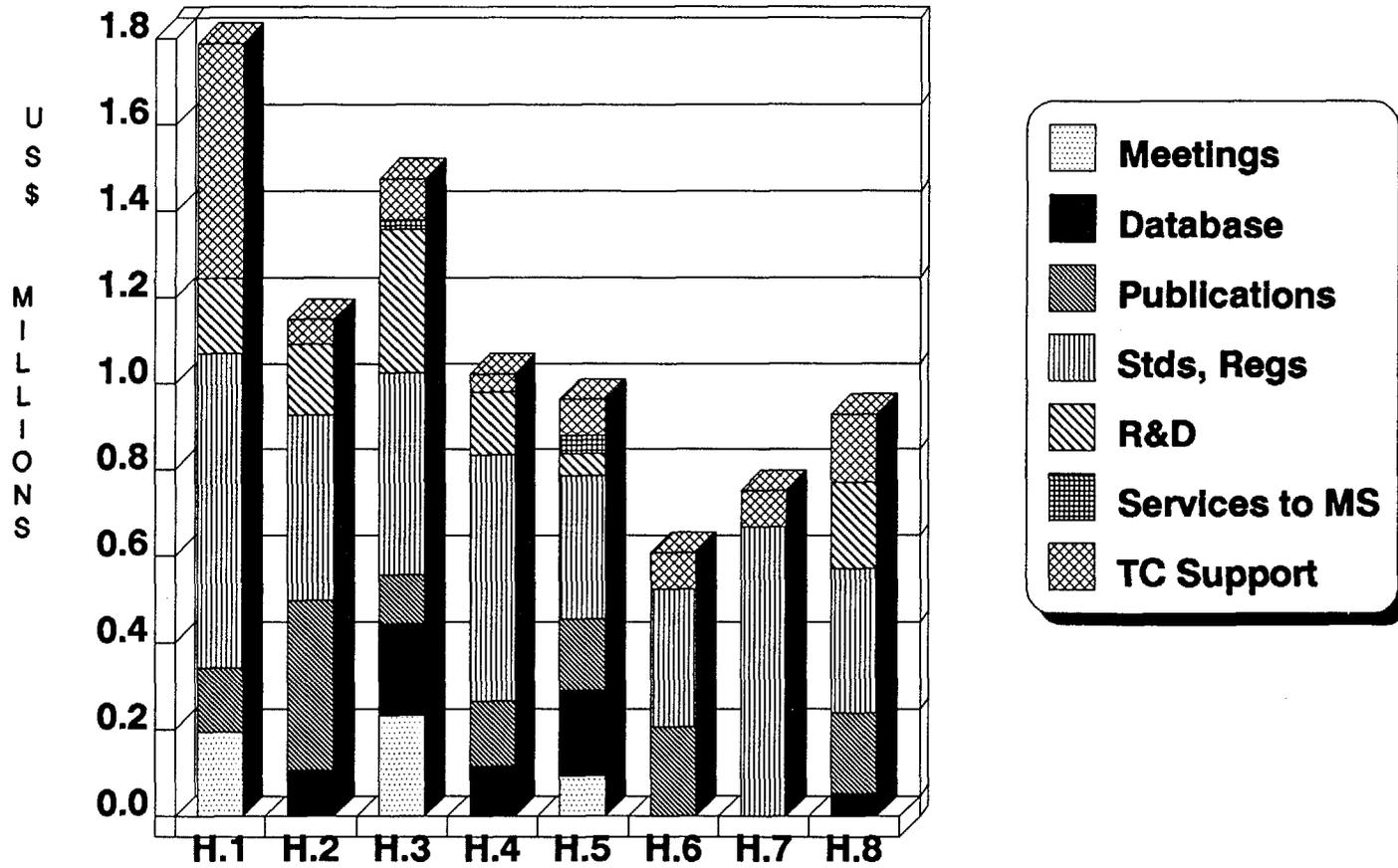
Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O										
H.1. Basic Principles and Criteria	NENS	2.9	2.6	-	193 000	-	149 000	-	728 000	175 000	-	544 000	-	1 789 000
H.2. Occupational Radiation Protection	NENS	2.8	1.2	-	-	106 000	392 000	-	431 000	164 000	-	58 000	-	1 151 000
H.3. Environmental Assessment and Protection	NENS	2.7	1.2	-	232 000	211 000	104 000	-	470 000	264 000	-	84 000	-	1 365 000
	RILS	a/	a/	-	-	-	10 000	-	-	70 000	21 000	11 000	-	112 000
H.4. Safe Transport of Radioactive Materials	NENS	1.2	2.3	-	-	116 000	149 000	-	570 000	148 000	-	42 000	-	1 025 000
H.5. Emergency Planning and Preparedness	NENS	1.6	1.9	-	95 000	195 000	165 000	-	330 000	53 000	41 000	87 000	-	966 000
H.6. Control of Radiation Sources	NENS	1.2	0.8	-	-	-	206 000	-	317 000	-	-	85 000	-	608 000
H.7. Radiation Safety of Nuclear Fuel-Related Activities	NENS	1.7	1.1	-	-	-	-	-	667 000	-	-	85 000	-	752 000
H.8. Exposure Assessment and Handling	NENS	2.1	1.1	-	-	53 000	186 000	-	332 000	201 000	-	159 000	-	931 000
Programme H Total		16.2	12.2	-	520 000	681 000	1 361 000	-	3 845 000	1 075 000	62 000	1 155 000	-	8 699 000

a/ Cost-free experts only.

H. Radiation Protection

Main Means by Area of Activity

Graph 8



PROGRAMME H: RADIATION PROTECTION

Summary of Regular Budget estimates by Area of Activity

Table 30

Area of Activity / Programme		Respon Div.	1988 Budget	Expenditure increase(decr.) %		1989 at 1988 prices	Expenditure increase(decr.) %		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
H.1.	Basic Principles and Criteria	NENS	408 000	398 000	97.5	806 000	76 000	9.4	882 000	4.0	838 000	3.7	951 000
H.2.	Occupational Radiation Protection	NENS	772 000	(267 000)	(34.6)	505 000	76 000	15.0	581 000	4.0	525 000	3.7	626 000
H.3.	Environmental Assessment and Protection	NENS	828 000	(75 000)	(9.1)	753 000	(213 000)	(28.3)	540 000	4.0	783 000	3.7	582 000
		RILS	253 000	(200 000)	(79.1)	53 000	-	-	53 000	4.1	55 000	3.8	57 000
H.4.	Safe Transport of Radio- active Materials	NENS	522 000	(70 000)	(13.4)	452 000	63 000	13.9	515 000	4.0	470 000	3.7	555 000
H.5.	Emergency Planning and Preparedness	NENS	873 000	(439 000)	(50.3)	434 000	44 000	10.1	478 000	4.0	451 000	3.7	515 000
H.6.	Control of Radiation Sources	NENS	154 000	138 000	89.6	292 000	(10 000)	(3.4)	282 000	4.0	304 000	3.7	304 000
H.7.	Radiation Safety of Nuclear Fuel-Related Activities	NENS	177 000	158 000	89.3	335 000	40 000	11.9	375 000	4.0	348 000	3.7	404 000
H.8.	Exposure Assessment and Handling	NENS	386 000	62 000	16.1	448 000	(17 000)	(3.8)	431 000	4.0	466 000	3.7	465 000
Total - Programme H			4 373 000	(295 000)	(6.7)	4 078 000	59 000	1.4	4 137 000	4.0	4 240 000	3.7	4 459 000

Programme H: List of projects and estimated total resources for 1989/1990Table 31

Area of Project Activity Code	Estimated Resources for 1989/1990			
	Regular Budget	Extra- Budgetary	TC	Total
H.1. Basic Principles and Criteria				
H.1.01 Basic Radiation Protection Criteria for Anticipated Situations	574 000			
H.1.02 Basic Radiation Protection Criteria for Unanticipated Situations	416 000			
H.1.03 Strengthening Radiation Protection Infrastructures	799 000	196 000		
Sub-total	1 789 000	196 000	630 000	2 615 000
H.2. Occupational Radiation Protection				
H.2.01 Guidelines for Radiation Protection in Design and Operations	625 000			
H.2.02 Guidelines for Occupational Monitoring	526 000			
Sub-total	1 151 000	-	4 116 000	5 267 000
H.3. Environmental Assessment and Protection				
H.3.01 Guidelines on the Limitation of Releases to the Environment	322 000			
H.3.02 Environmental Monitoring	1 043 000			
H.3.03 Measurement of Accidentally Released Radionuclides in Environmental and Food Samples (RILS)	112 000	282 000		
Sub-total	1 477 000	282 000	2 058 000	3 817 000
H.4. Safe Transport of Radioactive Materials				
H.4.01 Maintenance of the Transport Regulations	562 000			
H.4.02 Implementation of the Transport Regulations	463 000			
Sub-total	1 025 000	-	a/`	1 025 000
H.5. Emergency Planning and Preparedness				
H.5.01 Development of Guidelines for Emergency Planning and Preparedness	507 000			
H.5.02 Implementation of Guidelines for Emergency Planning and Preparedness	170 000			
H.5.03 Emergency Assistance Services	289 000			
Sub-total	966 000	-	348 000	1 314 000

H. RADIATION PROTECTION

Programme H: List of projects and estimated total resources for 1989/90

Table 31 - Contd.

Area of Project Activity Code	Estimated Resources for 1989/1990			
	Regular Budget	Extra- Budgetary	TC	Total
H.6. Control of Radiation Sources				
H.6.01 Safe Use and Control of Radiation Sources	608 000	166 000		
	Sub-total	608 000	166 000	a_/ 774 000
H.7. Radiation Safety of Nuclear Fuel-Related Activities				
H.7.01 Guidelines on Radiation Safety of Nuclear Fuel-Related Facilities	752 000			
	Sub-total	752 000	-	a_/ 752 000
H.8. Exposure Assessment and Handling				
H.8.01 Guidelines for the Monitoring of Intakes of Radioactive Materials and the Assessment of Internal Doses	468 000			
H.8.02 Guidelines for the Diagnosis, Prognosis and Treatment of Individuals Exposed to Radiation	463 000			
	Sub-total	931 000	-	a_/ 931 000
Total: Programme H - Radiation Protection	8 699 000	644 000	7 152 000	16 495 000

a_/ Owing to the restructuring of the programme, it has not been possible to make TC fund estimates for these areas of activity.

PROGRAMME I: SAFETY OF NUCLEAR INSTALLATIONS

Area of Activity I.1
Basic Principles and Criteria

Problem I

A number of nuclear safety issues of international significance will arise which require co-operative international consideration and the formulation of recommendations for national and international actions (Project I.1.01).

Problem II

Member States, particularly those in the early stages of nuclear power development, face numerous obstacles in establishing and maintaining effective nuclear regulatory systems (Project I.1.02).

Project I.1.01

Basic Safety Principles

I/1. Objective: To organize an effective exchange of technical information by collecting, reviewing and disseminating data on the more recent safety issues and to propose solutions for them with a view to establishing commonly shared safety principles and objectives. To establish probabilistic safety criteria for the evaluation of PSA results and to provide a consistent approach to radiation protection and nuclear safety.

I/2. Outline of the work planned: The project essentially involves the activities of the International Nuclear Safety Advisory Group (INSAG), which was set up in 1985 and reconstituted in 1988. INSAG will assist in the interpretation and implementation of the Basic Safety Principles it completed in 1988 and prepare reports on selected safety policy issues, the focus in 1989-90 being on operational safety.

I/3. During the period 1989-90 a consistent set of probabilistic safety criteria will be developed against which safety assessment results can be compared and procedures will be drawn up for demonstrating compliance with these criteria. Studies will also be made of the use of probabilistic criteria for operational safety.

I/4. Expected duration: This is a continuing project.

Project I.1.02

Strengthening Nuclear Safety Infrastructures

I/5. Objective: To provide assistance to regulatory bodies, operating organizations and designers in establishing policy for the achievement of the nuclear safety objectives set out in the safety principles, to facilitate the timely exchange of information among Member States on key international issues in nuclear safety and on nuclear safety research, and to help Member States establish or strengthen nuclear safety infrastructures.

I/6. Outline of the work planned: The activities under this project will be implemented in conjunction with the "Radiation Protection" programme (Project H.1.03).

I. SAFETY OF NUCLEAR INSTALLATIONS

I/7. By 1988 the INSAG nuclear safety principles will have been published and the revision of the NUSS code and safety guides on regulatory organization initiated in 1987 will have been completed. A Nuclear Safety Standards Advisory Group (NUSSAG) is being established to monitor the implementation and development of the NUSS programme. The NUSS documents will be reviewed and further developed in the light of continuing experience in nuclear safety. Information on Member States' experience in using the NUSS recommendations for regulatory purposes will be collected and analysed.

I/8. A new type of service for enhancing the effectiveness of regulatory systems will be offered to requesting Member States. Guidelines for this service will be prepared on the basis of a questionnaire on regulatory systems distributed in 1987-88 and in the light of the results of the symposium on regulatory systems in 1988.

I/9. Data on national nuclear safety regulations, including major nuclear standards will be collected and a comprehensive library of such information established.

I/10. Information will be collected and analysed on developments of international interest in the nuclear safety and radiation protection field and will be made available through the annual Nuclear Safety Review and other means. A meeting of senior radiation protection and nuclear safety experts will continue to be held in connection with the General Conference.

I/11. It is expected that in 1988 agreement will be reached with NEA, CEC and CMEA concerning the joint publication every two years of radiation protection and nuclear safety research abstracts. It is planned to extend co-operation with these organizations by concluding an agreement on the exchange of safety-related experimental research results and on the use of safety-related computer codes, which will be made available to the Agency and, through it, to Member States

I/12. Expected duration: This is a continuing project

Area of Activity I.2 Safe Siting, Design and Construction of Nuclear Installations

Problem I

Developing Member States actively considering embarking on a nuclear power programme or constructing a research reactor require assistance in specifying the requirements for, and conducting the necessary assessments of, the safe siting, design and construction of nuclear installations (Projects I.2.01 and I.2.02).

Problem II

Relevant government agencies need to develop and improve the organizational and technical aspects of the physical protection of nuclear installations and materials. (Project I.2.03).

Project I.2.01

Siting of Nuclear Installations

I/13. Objective: To supplement existing NUSS guidance on site investigations and evaluations connected with the selection of sites and with the establishment of site provisions for the mitigation of accident consequences, and to provide direct assistance to Member States in implementing existing guidance.

I/14. Outline of the work planned: Technical documents on the re-assessment of existing reactor sites, on site inputs for PSA and on seismic safety margins for existing nuclear power plants will be issued in 1989-90. In connection with the latter, a data base will be set up containing historical data on the seismicity of existing sites.

I/15. Also, the existing NUSS recommendations will be supplemented with a safety series manual on QA in nuclear power plant siting.

I/16. Direct assistance will be provided to Member States through training courses and country-specific TC projects.

I/17. Expected duration: This is a continuing project.

Project I.2.02

Design and Construction of Nuclear Installations

I/18. Objective: To supplement and revise existing NUSS guidance and to assist Member States with its implementation.

I/19. Outline of the work planned: It is planned to revise several NUSS guides, in the light of recent changes made to the code of practice on design. Work on a safety guide on accident management considerations and containment considerations for severe accident mitigation will begin in 1990. Additional guidance will be drawn up on topics identified by NUSSAG.

I/20. A symposium on fire protection and fire-fighting will be held in 1989, following which manuals on the safety assessment of fire protection design and fire fighting practices under nuclear accident conditions will be drawn up. A symposium on balancing automation and human action in the management of abnormal situations in nuclear power plants will be organized in 1990.

I/21. Expected duration: This is a continuing project.

Project I.2.03

Physical Protection of Nuclear Installations

I/22. Objective: To foster improved physical protection of nuclear installations and materials by developing and organizing an international training course for Member States in the various technical disciplines involved.

I/23. Outline of the work planned: One international training course will be conducted annually. A technical report on trends in physical protection will be drawn up in 1989.

I. SAFETY OF NUCLEAR INSTALLATIONS

I/24. Expected duration: Continuing.

Area of Activity I.3. Safe Operation of Nuclear Installations

Problem I

The importance of ensuring a high level of safety in the operation of nuclear installations is generally recognized by Member States, and greater international co-operation and assistance are required (Projects I.3.01, I.3.02, I.3.03, I.3.04 and I.3.05)

Project I.3.01

Guidelines for the Safe Operation of Nuclear Power Plants

I/25. Objective: To supplement existing NUSS guidance and to assist Member States with its implementation.

I/26. Outline of the work planned: Two or three NUSS guides will be reviewed and possibly revised by 1990, taking into account advice from NUSSAG and information gained from OSART missions.

I/27. Country-specific assistance will be provided through TC projects. Interregional training courses on the safe operation of nuclear power plants will be organized annually.

I/28. Expected duration: This is a continuing project.

Project I.3.02

Safety Aspects of Nuclear Power Plant Ageing

I/29. Objective: To provide for the exchange of information on the safety aspects of plant ageing and to develop a strategy to cope with ageing to ensure safety over the plant lifetime.

I/30. Outline of the work planned: In view of the importance of this emerging issue, a periodic meeting of experts will be convened on the safety aspects of ageing for the regular exchange of operational experience and research results in this area and to advise on the Agency's programme. The possibility of organizing a CRP on nuclear power plant ageing and life extension after 1990 will be evaluated. Technical documents will be prepared on specific problems such as ageing assessment and the evaluation of ageing-sensitive equipment and on remedial actions. Work under this project will be co-ordinated with the "Nuclear Power" programme.

I/31. Expected duration: This is a continuing project.

Project I.3.03

Operational Safety Reviews of Nuclear Power Plants

I/32. Objective: To conduct international reviews of safety practices at representative nuclear power plants in Member States so as to enhance their operational safety, increase awareness of good approaches and practices, and improve local ability to conduct safety reviews.

I/33. Outline of the work planned: An average of 14 OSART missions will be conducted each year at the request of Member States. Further documents containing guidelines on the conduct of such missions, including the use of safety indicators, will be prepared. A meeting to exchange safety experience in pressurized heavy water reactors will be held and the results published in a technical document in 1989.

I/34. Expected duration: This is a continuing project.

Project I.3.04

Feedback of Operational Safety Experience

I/35. Objective: To improve the feedback of operational experience on a worldwide basis through the systematic collection, evaluation and dissemination of information on events of safety significance occurring in operating nuclear power plants in participating Member States, so that a repetition of such events in other plants, at other locations, may be prevented.

I/36. Outline of the work planned: Information on unusual events of safety significance at operating nuclear power plants will be collected, evaluated and disseminated through the Incident Reporting System (IRS). In-depth analyses of unusual events - identifying their direct and root causes, generic safety lessons and the appropriateness of any corrective actions taken - will be carried out by the Analysis of Safety-Significant Events Team (ASSET) service.

I/37. During the period 1989-90 it is expected that the IRS will achieve the status of a well-established, computerized system. It is expected that four ASSET missions will be conducted each year to assist Member States in evaluating events and to train operating personnel in the methodology of evaluation.

I/38. Annual meetings will be organized with Member States and international organizations participating in the IRS (such as NEA and the new world utilities group) in order to review unusual events and experience of particular interest. The work will be co-ordinated with other groups (in-house and outside) to avoid duplication of activities and to enhance the use of common data bases. A seminar on the use of IRS output in nuclear power plant safety is planned for 1990.

I/39. Steps will be taken to expand the scope of the IRS to include, in addition to incidents in nuclear power plants, information on incidents at research reactors.

I/40. Expected duration: This is a continuing project.

I. SAFETY OF NUCLEAR INSTALLATIONS

Project I.3.05

Research Reactors

I/41. Objective: To develop a set of safety requirements appropriate to research reactors and to conduct safety assessments of research reactor installations in Member States.

I/42. Outline of the work planned: A set of safety guides in this area will be completed by 1991, five of the remaining documents being prepared in the period 1989-90. A seminar on the safety aspects of research reactors and critical assemblies is to be held in 1989 and will include a review of renewal and upgrading topics. A training course on research reactor operation and safety assessment is planned for 1990. A three-year CRP on the failure rate of equipment at research reactors will be initiated in 1988.

I/43. Some eight research reactor safety review missions (INSARR - Integrated Safety Assessment of Research Reactors) will be organized annually upon request, including missions to installations covered by Agency bilateral project agreements.

I/44. Expected duration: The safety guides will be completed in 1991 while the safety reviews are of a continuing nature.

Area of Activity I.4 Accident Management and Mitigation

Problem I

Many Member States implementing nuclear power programmes require assistance in evaluating the vulnerability of their nuclear power plants to severe accidents and in establishing a policy for the prevention and management of severe accidents (Projects I.4.01 and I.4.02).

Project I.4.01

Strategies for Accident Management

I/45. Objective: To promote the exchange of information among Member States on severe accident phenomena and strategies for their control at different types of plant.

I/46. Outline of the work planned: In the period 1989-91, technical reports and documents will be prepared on such topics as containment performance and behavior under extreme conditions, assessment of the vulnerability of plants to severe accidents, and material interactions under severe accident conditions. In addition, two CRPs will be established, dealing with containment integrity for accident conditions beyond the design basis (1989-91) and severe accident management (1988-90).

I/47. Expected duration: Continuing.

Project I.4.02

Guidelines for Severe Accident Mitigation

I/48. Objective: To develop guidelines and manuals on accident mitigation and to provide training on the subject to Member States.

I/49. Outline of the work planned: The main effort during the period 1988-91 will concern the preparation of guidelines and manuals on the principal aspects of severe accident management, with particular emphasis being placed on symptom-oriented operating instructions.

I/50. Direct assistance will be given to Member States through interregional training courses and advisory missions.

I/51. Expected duration: Continuing

Area of Activity H/I.1
Safety Assessment Techniques

Problem I

Many developing Member States, and particularly those with nuclear power programmes, require assistance in applying modern methods of accident analysis to improve safety (Project H/I.1.01).

Problem II

Member States - particularly those implementing nuclear power programmes - require guidance on and assistance in the application of probabilistic techniques to systems and human performance and on the comparative assessment of nuclear and other industrial risks (Projects H/I.1.02, H/I.1.03 and H/I.1.04).

Project H/I.1.01

Assistance in Conducting Accident Analysis

I/52. Objective: To provide assistance with accident analysis mainly to developing countries and countries which are not members of OECD or CEC and to provide access to, transfer of and training on advanced analysis methodologies with a view to increasing the knowledge and ability of Member States to perform accident analysis.

I/53. Outline of the work planned: The project will comprise mainly TC activities executed through regional and country-specific projects aimed principally at making available computer codes and time and providing advice and training. Standard problem exercises will be organized in which selected analyses will be performed by teams of experts from countries participating in regional projects.

I/54. In addition, technical documents will be prepared on computer-aided safety analysis and advanced safety code application.

I. SAFETY OF NUCLEAR INSTALLATIONS

I/55. Expected duration: This is a continuing project.

Project H/I.1.02

Probabilistic Safety Assessment Techniques

I/56. Objective: To provide Member States with guidance on the conduct of PSAs and on the use of PSA results for safety decisions in design and operation.

I/57. Outline of the work planned: There are two areas of concentration: the development and implementation of guidance for conducting PSAs, and the development of PSA applications. In the first area, a number of technical documents will be prepared by 1991: among the important topics dealt with will be the use of PSA for guidance on safety decisions and the improvement of operator performance under accident conditions using simulator training and advanced operator aids. Safety series documents containing guidance on how to perform PSAs will also be prepared.

I/58. In the second area, the application of PSA will be promoted through a CRP and TC projects, which will be conducted on a regional and interregional basis, and through independent peer review missions. Technical documents will be prepared on the use of PSA and related computer systems to enhance safety, as will a technical report on the use of PSA for evaluating new design and mitigation systems.

I/59. Expected duration: Continuing.

Project H/I.1.03

Guidelines for the Assessment of Human Reliability

I/60. Objective: To provide Member States with guidance on improving human reliability for the prevention of severe accidents.

I/61. Outline of the work planned: A number of technical reports on human reliability data collection and classification and on experience in their practical use for operator training and plant management will be prepared. Also, a CRP will be established in 1990 to develop human reliability data banks.

I/62. Through TC projects, direct assistance will be provided to Member States in identifying human actions which can lead to accident conditions and in the elaboration of preventive measures.

I/63. Expected duration: Continuing.

Project H/I.1.04

Risk Management, Comparative Assessment and Decision-Aiding Techniques

I/64. Objective: In co-operation with other international organizations, to provide Member States with a comprehensive guide for the comparative assessment and the management of health and environmental risks for energy and

other complex industrial systems, including computer codes, data, models and case studies, and with guidance on various decision-aiding techniques for utilization in PSA methodology.

I/65. Outline of the work planned: The project comprises three components, the first being joint activities with other international bodies (UNEP, WHO, UNIDO) aimed at extending consequence analysis to all types of industrial risk management, the second relating to the evaluation of decision-aiding techniques, and the third concerning assistance to Member States in the assessment of the consequences of nuclear accidents.

I/66. With regard to the first component, a project document entitled "Inter-Agency Collaboration on the Assessment and Management of Health and Environmental Risks from Energy and Other Complex Industrial Systems - Phase I" was signed by the Agency, UNEP and WHO in 1987. The procedures guide will be finalized in 1991 and will be supplemented with a two-year phase to promote the case in Member States. In support of this work, a risk data base will be established containing information on routine emissions and component failure rates and computer codes to be used in assessing industrial risk. Emphasis will be placed on providing the basis for assessing the environmental impact of nuclear power in comparison with alternative energy sources.

I/67. In the second area, a technical report on decision-aiding techniques will be prepared in 1989, and the practical use of such techniques will be reviewed in 1990. A CRP on the use of decision-aiding techniques in safety decisions will be initiated in 1990.

I/68. The third component of the project will be implemented primarily through TC projects and a CRP on sensitivity studies of consequence modelling.

I/69. Expected duration: 1987-1993.

PROGRAMME I: SAFETY OF NUCLEAR INSTALLATIONS

Summary of main means by Area of Activity for 1989/1990

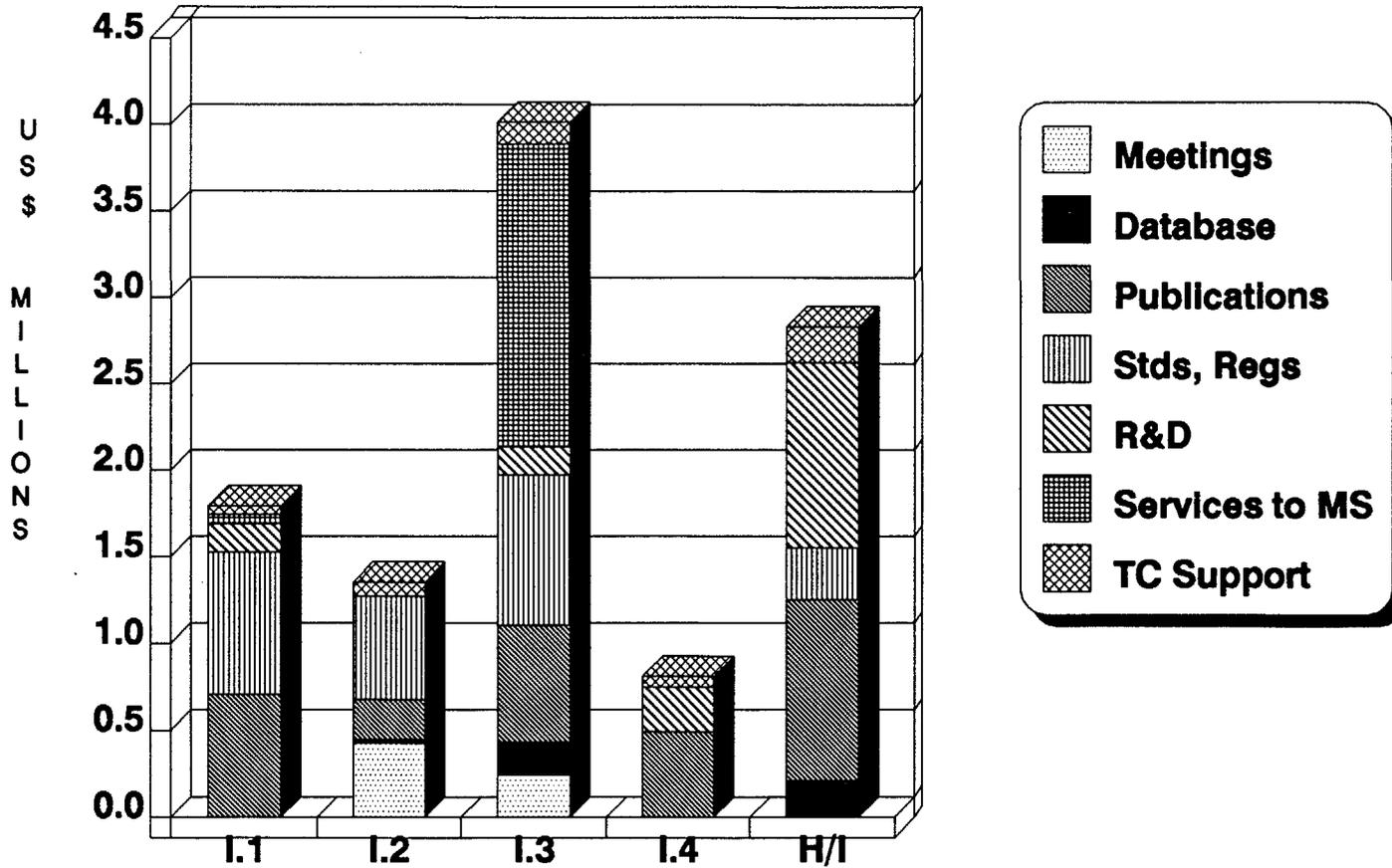
Table 32

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O										
I.1. Basic Principles and Criteria	NENS	2.2	1.6	-	-	-	705 000	-	823 000	165 000	55 000	50 000	-	1 798 000
I.2. Safe Siting, Design and Construction of Nuclear Installations	NENS	3.1	1.4	-	424 000	22 000	233 000	-	592 000	-	-	85 000	-	1 356 000
I.3. Safe Operation of Nuclear Installations	NENS	9.0	5.3	-	244 000	190 000	669 000	-	875 000	159 000	1 757 000	127 000	-	4 021 000
I.4. Accident Management and Mitigation	NENS	1.8	1.0	-	-	-	492 000	-	-	254 000	-	64 000	-	810 000
H/I Safety Assessment Techniques	NENS	5.7	4.5	-	-	211 000	1 042 000	-	302 000	1 070 000	-	211 000	-	2 836 000
Programme I Total		21.8	13.8	-	668 000	423 000	3 141 000	-	2 592 000	1 648 000	1 812 000	537 000	-	10 821 000

I. Safety of Nuclear Installations

Main Means by Area of Activity

Graph 9



PROGRAMME I: SAFETY OF NUCLEAR INSTALLATIONS

Summary of Regular Budget estimates by Area of ActivityTable 33

Area of Activity / Programme		Respon Div.	1988 Budget	Expenditure increase(decr.) %		1989 at 1988 prices	Expenditure increase(decr.) %		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
I.1.	Basic Principles and Criteria	NENS	899 000	5 000	0.6	904 000	(108 000)	(11.9)	796 000	4.0	940 000	3.7	858 000
I.2.	Safe Siting, Design and Construction of Nuclear Installations	NENS	531 000	34 000	6.4	565 000	148 000	26.2	713 000	4.0	588 000	3.7	768 000
I.3.	Safe Operation of Nuclear Installations	NENS	2 652 000	(802 000)	(30.2)	1 850 000	95 000	5.1	1 945 000	4.0	1 924 000	3.7	2 097 000
I.4.	Accident Management and Mitigation	NENS	188 000	172 000	91.5	360 000	45 000	12.5	405 000	4.0	374 000	3.7	436 000
H/I.	Safety Assessment Techniques	NENS	1 689 000	(335 000)	(19.8)	1 354 000	(30 000)	(2.2)	1 324 000	4.0	1 409 000	3.7	1 427 000
Total - Programme I			5 959 000	(926 000)	(15.5)	5 033 000	150 000	3.0	5 183 000	4.0	5 235 000	3.7	5 586 000

I. SAFETY OF NUCLEAR INSTALLATIONS

Programme I: List of projects and estimated total resources for 1989/1990

Table 34

Area of Project Activity Code	Estimated Resources for 1989/1990			
	Regular Budget	Extra- Budgetary	TC	Total
I.1. Basic Principles and Criteria				
I.1.01 Basic Safety Principles	1 030 000			
I.1.02 Strengthening Nuclear Safety Infrastructures	768 000	93 000		
Sub-total	1 798 000	93 000	1 382 000	3 273 000
I.2. Safe Siting, Design and Construction of Nuclear Installations				
I.2.01 Siting of Nuclear Installations	326 000			
I.2.02 Design and Construction of Nuclear Installations	971 000			
I.2.03 Physical Protection of Nuclear Installations	59 000			
Sub-total	1 356 000	-	846 000	2 202 000
I.3. Safe Operation of Nuclear Installations				
I.3.01 Guidelines for the Safe Operation of Nuclear Power Plants	372 000			
I.3.02 Safety Aspects of Nuclear Power Plant Ageing	272 000			
I.3.03 Operational Safety Reviews of NPPs	1 597 000	200 000		
I.3.04 Feedback of Operational Safety Experience	767 000			
I.3.05 Research Reactors	1 013 000			
Sub-total	4 021 000	200 000	424 000	4 645 000
I.4. Accident Management and Mitigation				
I.4.01 Strategies for Accident Management	453 000			
I.4.02 Guidelines for Severe Accident Mitigation	357 000			
Sub-total	810 000	-	-	810 000
H/I Safety Assessment Techniques				
H/I. 1.01 Assistance in Conducting Accident Analysis	391 000	157 000		
1.02 Probabilistic Safety Assessment Techniques	1 103 000			
1.03 Guidelines for the Assessment of Human Reliability	646 000			
1.04 Risk Management, Comparative Assessment, and Decision-Aiding Techniques	696 000			
Sub-total	2 836 000	157 000	1 930 000	4 923 000
Total: Programme I - Safety of Nuclear Installations	10 821 000	450 000	4 582 000	15 853 000

PROGRAMME AREA 4

SAFEGUARDS

SAFEGUARDS

Summary of total resources by programme

Table 35

Programme	Man-years (Per Year)			Planned expenditure for programme implementation in 1989/1990				
	P	GS	M&O	Regular Budget estimates	Funds from other UN organizations	TC resources	Other extra- budgetary resources	Total
J. Safeguards	292.0 [5.9]	201.0 [15.5]	- [3.9]	109 603 000	-	188 000	7 310 000	117 101 000
Programme Area 4	292.0	201.0	-	109 603 000	-	188 000	7 310 000	117 101 000

Note: The manpower figures shown in parentheses above represent the number of man-years of Agency Laboratory staff working for this programme.

PROGRAMME J: SAFEGUARDS

Area of Activity J.1Planning, Direction, Co-ordination, Control and EvaluationActivity J.1.01Planning, Direction, Control and Co-ordination

J/1. Objective: To plan, direct, co-ordinate, control and evaluate the activities of the Department of Safeguards in such a manner that the Agency's safeguards responsibilities are fulfilled effectively and efficiently.

J/2. Outline of the work planned: A documented organizational structure has been developed with clearly defined functional responsibilities, degrees of authority and channels of internal and external communication. The overall management of the Department is co-ordinated at the Deputy Director General and Director level. Internationally recognized external advisers and consultants, including members of the Standing Advisory Group on Safeguards Implementation (SAGSI), provide independent advice on technical issues and implementation questions.

J/3. The effective management of the Department will be a very high priority task. The individual and collective roles and contributions of all staff members in the Department will be better identified, defined and recognized.

J/4. A re-assessment of the responsibilities both of Member States and of the Secretariat under safeguards support programmes will be conducted and the conclusions therefrom implemented with the co-operation of the Member States concerned.

J/5. The comprehensive effort initiated in recent years to document the principles, policies and practices of safeguards implementation will be continued to ensure that all staff members in the Department are able to obtain the information, instructions and guidance required for the performance of their duties. Safeguards implementation and evaluation criteria will be developed and issued.

J/6. Efforts will continue to be made to enhance the overall quality of safeguards activities by broadening and strengthening the understanding of quality assurance requirements. The principal function of quality assurance specialists will be to advise and to assist all staff members to excel in the performance of their duties.

J/7. The co-ordination of intradepartmental activities involving two or more Divisions will receive very high priority in recognition of the fundamental importance of teamwork to the achievement of the Department's objective. Close and continuing communication between operations and support Divisions will enable timely feedback of operating experience for the establishment and effective implementation of the programmes of support Divisions.

Activity J.2
Safeguards Operations

Activity J.2.01

Verification

J/8. Objective: To obtain, through independent on-site verification, the information essential to the provision of assurance that States are complying with their undertakings regarding non-proliferation and the peaceful use of nuclear energy.

J/9. Outline of the work planned: Inspection scheduling and planning, verification of the presence and use of reported material and checking of related records during inspection, evaluation of inspection results, follow-up actions, and reporting on results, including providing statements to States, are the main activities, for which substantial co-operation on the part of States as partners in safeguards agreements is indispensable.

J/10. Safeguards activities are planned and performed on the basis of inspection goals established for all types of facility under safeguards. A high degree of goal attainment is the most vital technical objective of safeguards, and a major part of the Department's planning is aimed at increasing the degree of inspection goal attainment.

J/11. In order to achieve a high degree of goal attainment, a sufficiently large number of well-qualified inspectors must be available together with the necessary safeguards equipment. A full-time inspector designated to one or more countries is expected to perform an average of approximately 52 days of inspection work per year at safeguarded facilities.

J/12. Verification is achieved during inspection through independent measurement of nuclear material using Agency-owned or Agency-authenticated equipment and procedures and through the use of independent containment and surveillance (C/S) measures.

Activity J.2.02

Negotiation of Subsidiary Arrangements

J/13. Objective: To establish, through the negotiation and conclusion of the relevant legal instruments, the basis for the implementation and performance of safeguards activities.

J/14. Outline of the work planned: This activity involves negotiations with States or groups of States, and developing and reviewing the technical bases for these negotiations.

J/15. The conclusion of six General Parts of subsidiary arrangements and 131 facility attachments was outstanding at the end of 1987. A more centralized approach will be implemented with the aim of concluding as many of these instruments as possible and of identifying and tackling problems hindering timely conclusion.

Activity J.2.03Liaison with State Authorities

J/16. Objective: To improve the implementation of safeguards through better liaison and co-ordination with State authorities, while maintaining independence.

J/17. Outline of the work planned: Greater emphasis will be placed on consultation with national authorities. Among the specific issues dealt with will be: improved and more cost-effective inspection planning (including inspector designations); the provision of assistance to some Member States in setting up and operating national systems for accounting for and controlling nuclear material subject to safeguards; improved procedures for physical inventory verification; improved arrangements for the use of Agency-owned, non-destructive assay (NDA) instruments or of facility-installed authenticated equipment; arrangements for the more rapid transport of safeguards samples.

Area of Activity J.3
Safeguards SupportActivity J.3.01Safeguards Information Services

J/18. Objective: To maintain and improve a computer-based information system to provide services essential to the analysis and evaluation of safeguards implementation activities by collecting, storing, and processing data submitted via accounting reports, transfer notifications and design information questionnaires, data acquired during inspections and the results therefrom.

J/19. Outline of the work planned: States which have safeguards agreements with the Agency undertake to submit accounting reports which enable the Agency to maintain an up-to-date record of the quantity, composition, location and movement of nuclear material and other materials, and a record of facilities, components, equipment and technical information. On the basis of the initial inventories and the accounting reports submitted by States, a book inventory of nuclear material is maintained for each material balance area or accounting area. Information based on the current status of the book inventory is supplied to inspectors before each inspection.

J/20. The IAEA Safeguards Information System (ISIS) has been developed in order to process the above data in a timely manner as well as to process data related to the management of the Department of Safeguards. The system, which is based on a mainframe computer and a number of personal computers with a centralized data base, will be modified in 1989-90 to cope with the growing workload and at the same time to incorporate modern information technology. This will require revision and development of large portions of application software.

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J/21. As the volume of international transfers grows, there is a corresponding increase in workload because of the transit matching required. Procedures to improve the flow of information necessary for the timely conduct of transit matching will be developed with the co-operation of Member States.

J/22. A new format will be introduced for statements in accordance with paragraphs 90(a) and 90(b) of INFCIRC/153, and computerized procedures will be used to improve the timeliness of submission of statements to Member States.

J/23. The capability of the system to handle INFCIRC/153-type nuclear material accounting (including material transfers) will be updated, and computer support for INFCIRC/66-type nuclear material accounting and for material-in-transit will be developed. In addition, a seminar on safeguards accounting data will be held as part of continuing efforts to improve the reporting process for nuclear material accounting information.

J/24. System components pertaining to inspection reporting (including improved quality control) and the automatic generation of statements and Safeguards Implementation Report (SIR) information will be expanded.

J/25. Owing to the continuous expansion of system components and services provided to a large number of users (see paragraphs J/21-J/24), the capability of ISIS to handle information in a timely and effective way will be expanded. More specifically, the number of work stations (terminals, personal computers and word processing devices) installed in the Department is expected to reach 245 by the end of 1988 and grow by 15% annually in subsequent years. The expansion of the local area network and its services is foreseen in the years 1989 and 1990: this will involve connecting the majority of the work stations installed at headquarters to the network and providing limited data transfer capability to safeguards field offices.

J/26. The use of personal computers in the field will be increased with the aim of assisting the collection and evaluation of safeguards information in the field and of ensuring an integrated flow of information from field inspections to ISIS.

Activity J.3.02

Safeguards Instruments, Methods and Techniques

J/27. Objective: To provide the operations Divisions with equipment, techniques and procedures for safeguards measurements and C/S in order to help achieve maximum technical effectiveness and efficiency.

J/28. Outline of the work planned: Instruments and C/S equipment will be developed with the assistance of consultants and safeguards support programmes. These instruments and equipment will be authorized for routine use after appropriate field testing. This activity is composed of a number of tasks which will continue over several years, although some are expected to be completed in 1989 and 1990.

J/29. In addition to research and development activities financed from the Regular Budget, the contributions made under Member State support programmes will be co-ordinated. Essential development activities must continue if the quality of safeguards work is to be maintained at present levels. This

includes the replacement of obsolescent equipment and components, the incorporation of new technology and further development work for the effective safeguarding of the new highly automated facilities which are coming into operation.

J/30. Essential research and development activities undertaken in 1987-88 will be continued. Particular emphasis will be placed on the activities described below.

J/31. The development of authentication techniques will become increasingly important for facilities which feature more automatic process systems with limited access. In order to produce a credible, practical, cost-effective and tamper-indicating system, careful attention will be paid to the individual features of the instrument, facility and technique in question.

J/32. Satisfactory progress is being made with the development of new optical surveillance systems and - in particular - highly reliable cost-effective closed circuit television systems needed to complement and eventually replace existing photographic surveillance systems. Procurement action is expected to commence in 1989.

J/33. Procedures for non-destructive assay of nuclear material and for C/S implementation at nuclear facilities will be established according to an approved format and guidelines for equipment use.

J/34. Measurement techniques for the "limited-frequency unannounced access" safeguards approach for centrifuge enrichment plants will be further developed and progressively implemented. Particular importance is attached to such techniques in view of the significant increase that will occur in the next few years in the capacity of enrichment facilities where this approach is expected to be implemented.

J/35. The equipment performance monitoring and control programme will continue.

J/36. The safeguards approach for a heavy water production plant which has been under development for some time will be implemented. Instrumentation for material balance and process control data will be installed, tested and evaluated. Delays in the construction of the heavy water production plant have extended the Agency's schedule, but it is now expected that the plant will start up in 1989 and that the test and demonstration phase will be carried out in 1990-91.

J/37. It is expected that a number of long-term away-from-reactor spent fuel storage facilities will be placed under safeguards in the coming years. A number of these will permit only limited or even no inspector access to the fuel. After testing and evaluation, new reliable C/S instrumentation and safeguards procedures for these facilities will be implemented.

J/38. The quality of NDA data is heavily dependent on calibration and the representativeness of the standards used for this purpose. Efforts to develop an integrated approach to the deployment and use of standards for NDA will therefore continue.

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J/39. The timeliness of safeguards measurements is a continuing problem and will be further studied with the aim of specifying techniques and equipment that provide results quickly.

Activity J.3.03

Safeguards Systems and Approaches

J/40. Objective: To develop new safeguards concepts and approaches, update existing approaches and give guidance on their application; to prepare forecasts of materials and facilities to be safeguarded; to develop ways of measuring safeguards effectiveness and efficiency; to develop methods of optimizing inspection effort.

J/41. Outline of the work planned: Safeguards systems and approaches will be developed with the assistance of consultants and experts provided under various support programmes. Contact with State authorities and operators during the development of systems and approaches will be essential in order to ensure that the design and operation of nuclear facilities continue to facilitate the implementation of safeguards.

J/42. Emphasis in recent years has shifted from a study of advanced safeguards concepts and approaches to procedures for complying with existing safeguards criteria. This trend will continue, with the aim of improving safeguards goal attainment.

J/43. A long-term programme will be drawn up with the aim of improving the effectiveness and efficiency of safeguards, taking into account new technological developments and updated inspection goals.

J/44. Guidelines will be further elaborated and improved for the termination, suspension and exemption of safeguards on waste and nuclear material used in non-nuclear activities, held as retained waste, or placed in permanent disposal facilities.

J/45. Development and testing will be continued of specific safeguards procedures and approaches for identified key problems at various types of facility, including automated bulk handling facilities, large critical facilities, spent fuel storage and disposal facilities, on-load reactors, fast breeder reactors, enrichment plants employing advanced technologies, reprocessing plants and heavy water production plants.

J/46. Standard models of inspection activities will be updated and new models will be prepared for additional types of facility such as away-from-reactor spent fuel storage, low-enriched uranium fuel fabrication plants and on-load reactors.

J/47. Further studies will be made of safeguards concepts applicable to multiple facility nuclear fuel cycles.

J/48. The investigation of methods of optimizing the allocation of inspection effort at facility and State levels will continue, particular account being taken of the effects of restricted budgetary resources.

J/49. Forecasts of future Agency manpower requirements and quantities of nuclear materials subject to safeguards will be provided. Forecasting techniques will be further developed.

J/50. Methods for assessing the effectiveness of safeguards will continue to be studied.

Activity J.3.04

Technical Services

J/51. Objective: To provide safeguards inspectors with the necessary material and equipment and to instruct them in its use, to develop surveillance film, to verify seals after removal, and to assist in all aspects of verification through the use of destructive analysis.

J/52. Outline of the work planned: The workload in this area has increased in direct proportion to the level of safeguards inspection effort and the requirement for servicing and repairing newly acquired safeguards instruments and equipment. The effective management of this multi-million dollar inventory and the timely provision of technical services to inspectors require additional effort to ensure their optimization.

J/53. It is planned to replace the photographic surveillance equipment and film development services currently provided with video surveillance as the former are rapidly becoming obsolete. It is planned to spread the cost of this conversion, which will be in excess of \$2.5 million, over four or five years, with about \$1.5 million being spent in 1989-90.

J/54. In the period 1989-90, about 2500 samples per year are expected to be analysed at the Safeguards Analytical Laboratory (SAL) in Seibersdorf and at Network Analytical Laboratories.

J/55. The purchase of equipment and the training of staff to perform destructive on-site analyses at large bulk handling facilities will be completed during the period 1989-1990.

Activity J.3.05

Evaluation of Safeguards Effectiveness and Efficiency

J/56. Objective: To perform data analyses and material balance evaluations based on data supplied by States and obtained through Agency activities; to prepare comparative studies and summaries, to prepare the annual Safeguards Implementation Report (SIR), to formulate recommendations for improvements in effectiveness and efficiency and to improve evaluation methods.

J/57. Outline of the work planned: This activity will include collecting and analysing information and data from State accounting reports and from Agency safeguards activities in the field, at Headquarters and at field offices; carrying out internal reviews of safeguards activities, and following up the action plans arising from problems identified in comparative studies, internal

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reviews and the SIR. The annual SIR and the safeguards chapter of the Agency's annual report are major outputs of the evaluation process.

J/58. As safeguards implementation and criteria evolve, the methodology for evaluating safeguards effectiveness will require careful attention in the planning process. Probabilistic concepts and extended use of random selection will be further developed for evaluation purposes. Methods for transferring data for evaluation will be improved and procedures incorporating computer assistance will be further developed. Data obtained from the use of NDA equipment will be evaluated to assist in improving the use of existing equipment and in developing new equipment; this includes characterization of NDA reference materials and further development of measurement error estimation procedures. Procedures for determining the effectiveness of independent measurements in achieving specified goal quantities and probabilities will be further developed. Procedures will also be developed to integrate and optimize sample plans for destructive and non-destructive measurements to obtain improved timeliness and verification coverage of material balances. Tank calibration procedures will be further developed and assessed with a view to identifying and reducing the causes of systematic and random errors.

Activity J.3.06

Quality Assurance

J/59. Objective: To ensure that the Agency's safeguards activities are of a high quality.

J/60. Outline of the work planned: A disciplined approach will be maintained to the management and conduct of safeguards activities which affect the quality of the Agency's fulfilment of its obligations under safeguards agreements.

J/61. Additional training in the discipline of quality assurance will be provided to managers, who have responsibility for assuring quality as part of their management functions, and to staff, who have the basic responsibility for achieving quality in performing their individual tasks. This approach to all activities affecting the quality of safeguards activities will more fully incorporate quality assurance principles in design, standards, documentation, and procurement of material, equipment, instruments, and services. This will include methods of identifying and correcting problems and of analysing and correcting the underlying causes of recurring problems. Quality assurance audits will be conducted on selected safeguards activities.

Activity J.3.07

Standardization, Training and Administrative Support

J/62. Objective: To ensure an optimal and uniform basis for inspection and related activities called for by safeguards agreements, to provide administrative support to safeguards activities, to train new inspectors and to assist experienced inspectors in acquiring additional skills.

J/63. Outline of the work planned: To ensure that procedures governing all aspects of safeguards activities are correctly established and documented, the Safeguards Manual will be continuously updated.

J/64. A high degree of managerial discretion in the allocation of approved resources and manpower will be necessary in order to respond to unpredicted high priority needs. The role of budgetary and personnel management will therefore become increasingly important and the management of the Department will be required to exercise greater responsibility for financial planning, budgeting, expenditure commitment and control. The safeguards management information system will be further improved to provide full support for these tasks.

J/65. Training will concentrate on management and technical training for new and existing staff. Re-training will become increasingly important as safeguards technology develops and the maturity of the staff increases.

J/66. In order to increase the opportunities for nationals of developing countries to obtain a position in the inspectorate, it is planned to carry out in 1989 a training programme for professionally qualified persons who are not able to acquire the necessary level of practical experience in nuclear facilities. The programme will last for about one year and, upon satisfactory completion, participating trainees should be eligible to apply for inspector posts.

PROGRAMME J: SAFEGUARDS

Summary of main means by Area of Activity for 1989/1990Table 36

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Admin. sup- port and management	Services to Membar States	TC support	Work for others	Total Regular Budget
		P	GS	M&O											
J.1. Planning, Direction, Co-ordination, Control and Evaluation	DDGSG	-	-	-	-	-	-	-	-	-	-	-	-	-	[751 000]a/
J.2. Safeguards Operations	SGOP	196.0	98.0	-	-	-	57 384 000	-	-	-	-	-	-	-	57 384 000
J.3. Safeguards Support	SGDE,SGIT,SGEV and SGSA	96.0 [5.9]	103.0 [15.5]	- [3.9]	80 000	15 396 000	-	27 649 000	1 200 000	5 741 000	2 143 000	-	10 000	-	52 219 000
Programme J Total		292.0	201.0	-	80 000	15 396 000	-	85 033 000	1 200 000	5 741 000	2 143 000	-	10 000	-	109 603 000

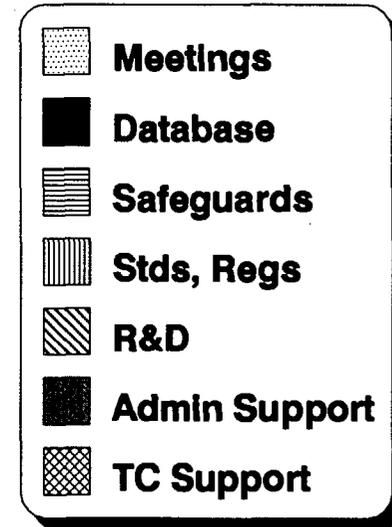
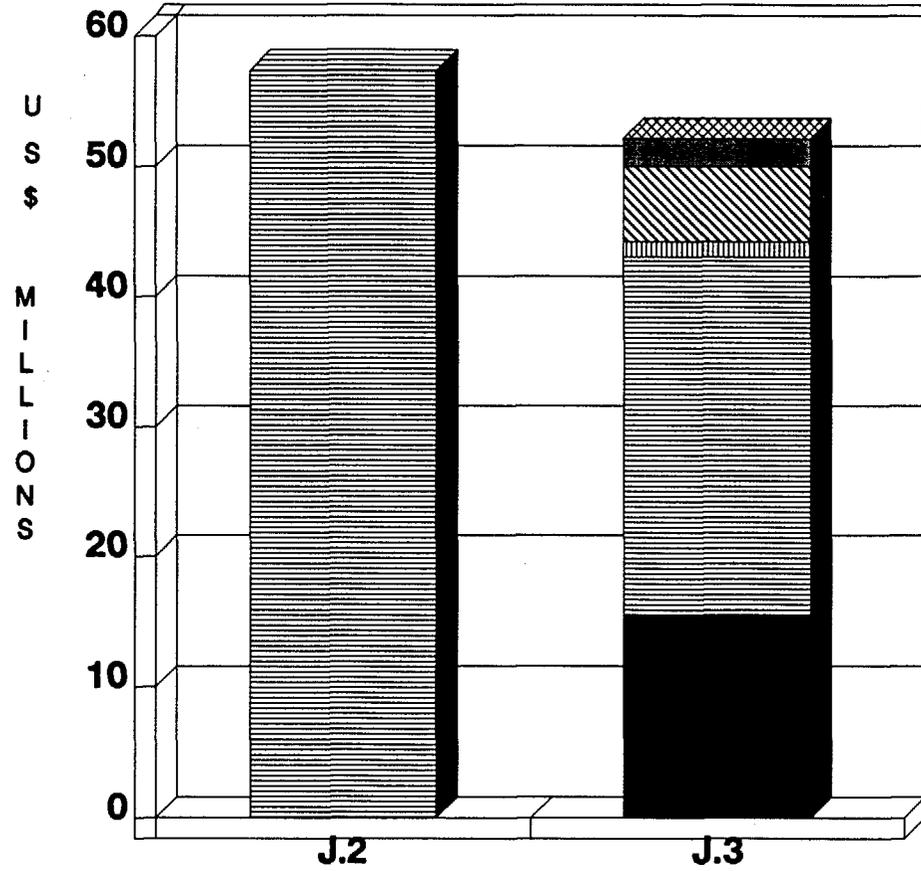
Note: The manpower figures shown in parentheses above represent the number of man-years of Agency Laboratory staff working for that particular area of activity.

a/ Included in S.1.1. - General Management.

J. Safeguards

Main Means by Area of Activity

Graph 10



PROGRAMME J: SAFEGUARDS

Summary of Regular Budget estimates by Area of ActivityTable 37

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure increase(decr.) %	1989 at 1988 prices	Expenditure increase(decr.) %	1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase		
J.1. Planning, Direction, Co-ordination, Control and Evaluation	DDGSG	-	-	-	-	-	-	[439 000]a/	-	[312 000]a/		
J.2. Safeguards Operations	SGOP	25 013 000	859 000	3.4	25 872 000	2 491 000	9.6	28 363 000	3.6	26 802 000	4.1	30 582 000
J.3. Safeguards Support	SGDE, SGIT SGEV, SGSA	24 046 000	653 000	2.7	24 699 000	(51 000)	(0.2)	24 648 000	4.0	25 681 000	3.5	26 538 000
Total - Programme J		49 059 000	1 512 000	3.1	50 571 000	2 440 000	4.8	53 011 000	3.8	52 483 000	3.8	57 120 000

a/ Included in S.1.1 - General Management.

Programme J: List of projects and estimated total resources for 1989/1990Table 38

Area of Project Activity Code	Estimated Resources for 1989/1990			
	Regular Budget	Extra- Budgetary	TC	Total
J.1. Planning, Direction, Co-ordination, Control and Evaluation				
J.1.01 Planning, Direction, Control and Co-ordination				
	Sub-total a/ [751 000]	-	-	[751 000]
J.2. Safeguards Operations				
J.2.01 Verification	45 784 000			
J.2.02 Negotiation of Subsidiary Arrangements	5 800 000			
J.2.03 Liaison with State Authorities	5 800 000			
	Sub-total	57 384 000	-	57 384 000
J.3. Safeguards Support				
J.3.01 Safeguards Information Services	15 476 000			
	Sub-total	15 476 000	-	15 476 000
J.3.02 Safeguards Instruments, Methods and Techniques	3 377 000	7 310 000		
J.3.03 Safeguards System and Approaches	2 364 000			
J.3.04 Technical Services	20 047 000			
	Sub-total	25 788 000	7 310 000	33 098 000
J.3.05 Evaluation of Safeguards Effectiveness and Efficiency	4 359 000			
J.3.06 Quality Assurance	1 453 000			
	Sub-total	5 812 000	-	5 812 000
J.3.07 Standardization, Training and Administrative Support	5 143 000			
	Sub-total	5 143 000	-	188 000 5 331 000
Total: Programme J - Safeguards	109 603 000	7 310 000	188 000	117 101 000

a/ Included in S.1.1. General Management.

Installations subject to safeguards or containing safeguarded material in non-nuclear-weapon States
(1987 to 1991)

Table 39

Type of installation	1987		1988 [1]		1989		1990		1991	
	NPT and/or Tlatelolco agreements	INFCIRC/66-type agreements								
Power reactors	157	28	173	16	177	16	183	16	190	17
Research reactors and critical assemblies	146	26	151	22	153	22	154	23	155	24
Conversion plants	4	3	4	3	4	3	4	3	4	3
Fuel fabrication plants	30	10	32	8	32	8	32	8	32	8
Reprocessing plants	4	2	5	1	5	2	5	2	5	2
Enrichment plants	5	1	6	1	6	2	7	2	8	2
Separate storage facilities	32	2	32	2	32	2	33	2	34	2
Other facilities (> 1 ekq)	43	3	43	3	43	3	43	3	43	3
Other locations (≤ 1 ekq)	378	28	378	28	378	28	378	28	378	28
Non-nuclear installations	0	2	0	2	0	2	0	2	0	2
TOTAL	799	105	824	86	830	88	839	89	849	91

[1] From 1988, Spanish installations are listed under NPT agreements rather than INFCIRC/66-type agreements.

Amounts of nuclear material under Agency safeguards
in non-nuclear-weapon States
(Status as of 31 December 1987 and forecast for 1989 and 1994)

Table 40

Material	Amounts (tonnes)					
	1987		1989		1994	
	NPT and/or Tlatelolco agreements	INFCIRC/66-type agreements	NPT and/or Tlatelolco agreements	INFCIRC/66-type agreements	NPT and/or Tlatelolco agreements	INFCIRC/66-type agreements
Plutonium	161.7	17.9	205-220	15-17	340-380	27-33
Uranium enriched to 20% or more	11.9	0.3	11.9	0.3	11.9	0.3
Uranium enriched to less than 20%	21 160	1890	24 000-26 000	1600-2000	36 000-40 000	3000-4000
Source material	32 850	2550	35 000-39 000	2600-3000	48 000-53 000	4200-5200

PROGRAMME AREA S

DIRECTION AND SUPPORT

DIRECTION AND SUPPORT

Summary of total resources by programme

Table 41

Programme	Man-years (Per Year)			Planned expenditure for programme implementation in 1989/1990				
	P	GS	M&O	Regular Budget estimates	Funds from other UN organizations	TC resources	Other extra- budgetary resources	Total
S.1 General Management and Secretariat of the Policy-making Organs	18.0	17.0	-	18 484 000	-	-	-	18 484 000
S.2 Administration	57.0	94.0	-	23 904 000	-	-	600 000	24 504 000
S.3 T.C. Servicing and Co-ordination	46.0	70.0	-	17 393 000	-	7 346 000 c/	-	24 739 000
S.4 General Services	10.0	71.0	28.0	34 197 000	-	-	-	34 197 000
S.5 Specialized Service Activities	22.0	37.0	-	15 516 000	-	238 000	-	15 754 000
S.6 Shared Support Services a/	120.0	227.0	23.0	3 016 000	-	-	-	3 016 000
				[55 443 000] b/				
Programme Area S	273.0	516.0	51.0	112 510 000	-	7 584 000	600 000	120 694 000

a/ All costs except those of the Library have been allocated to the user programmes. Contracts Administration Services, Conference Services, Interpretation, Translation and Records Services, Data Processing Services and Printing and Publishing Services are shared by the user programmes. Medical Services are allocated to Personnel Services. The cost of Radiation Protection Services is charged to Safeguards (Programme J) and TC Projects, and - in respect of other in-house utilization - to Area of Activity S.5.3. Only the Library has not been allocated to any other programme and the cost is therefore shown under this programme.

b/ Allocated costs as shown in Table 53.

c/ See footnote e/ on the Attachment to Tables 1 - 4.

PROGRAMME S.1

GENERAL MANAGEMENT AND SECRETARIAT OF THE POLICY-MAKING ORGANS

Area of Activity S.1.1.
General Management

S/1. The aim of the Office of the Director General is to propose the Agency's programmes within the scope of its statutory objectives and on the basis of recommendations made by advisory bodies, and to supervise their implementation pursuant to decisions of the Board of Governors and the General Conference. The Director General is also responsible for the executive management of the Agency as well as for the efficient conduct and co-ordination of its work.

S/2. Consistent with the practice of the United Nations Joint Inspection Unit, whose activities include support for evaluation, the post of programme evaluator/analyst established in the Office of the Director General in 1988 is being transferred in that year to the Office of Internal Audit and Management Services. The functions of the above post will remain the same as initially planned (see paragraph S/1 of document GC(XXX)/777).

S/3. The aim of the Office of the Deputy Director General for Administration is to ensure the effective functioning of the Agency's administrative activities. It is responsible for the overall direction and supervision of the management, budget and finance, personnel, legal and external relations services, in addition to the linguistic services and the "General Services" programme.

S/4. The aim of the Offices of the Deputy Director General for Research and Isotopes, for Nuclear Energy and Safety, for Technical Co-operation, and for Safeguards is to advise and assist the Director General in matters concerning the planning and implementation of the Agency's scientific, technical co-operation and safeguards programmes respectively. They are also responsible for the effective execution of approved programmes within their Departments.

Area of Activity S.1.2
Secretariat of the Policy-making Organs

S/5. The aim is to provide the organizational and administrative services required by the Policy-making Organs of the Agency, namely the General Conference, the Board of Governors and their Committees.

Area of Activity S.1.3
Internal Audit and Evaluation Support

S/6. The aim is to provide the Agency's management with independent appraisal services to assist them in discharging their responsibilities. These services include mainly financial audit, economy and efficiency audit and services to technical programme managers regarding the development and adaptation of evaluation methodology. An overview of the implementation of evaluation efforts will also be maintained.

PROGRAMME S.1: GENERAL MANAGEMENT AND SECRETARIAT OF THE POLICY-MAKING ORGANS

Summary of main means by Area of Activity for 1989/1990

Table 42

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Admin. sup- port and management	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O											
S.1.1 General Management	DDsG & DG	15.0	14.0	-	-	-	-	-	-	-	6 227 000	-	-	-	6 227 000
S.1.2 Secretariat of the Policy-making Organs	SEC	3.0	3.0	-	-	-	-	-	-	-	12 257 000	-	-	-	12 257 000
Programme S.1 Total		18.0	17.0	-	-	-	-	-	-	-	18 484 000	-	-	-	18 484 000

Summary of Regular Budget estimates by Area of Activity

Table 43

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure		1989 at 1988 prices	Expenditure		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
			increase(decr.) %	1989		increase(decr.) %	1990					
S.1.1 General Management		3 108 000	(118 000)	(3.8)	2 990 000	(136 000)	(4.5)	2 854 000	4.4	3 121 000	4.2	3 106 000
S.1.2 Secretariat of the Policy-making Organs	SEC	5 725 000	-	-	5 725 000	-	-	5 725 000	4.8	6 000 000	4.3	6 257 000
Total - Programme S.1		8 833 000	(118 000)	(1.3)	8 715 000	(136 000)	(1.6)	8 579 000	4.7	9 121 000	4.2	9 363 000

PROGRAMME S.2

ADMINISTRATION

Area of Activity S.2.1
External Relations

S/7. The aims are to provide the Agency with the appropriate services for maintaining and promoting good relations with Member States and international organizations, to follow and assess on a continuous basis developments in the United Nations and in Member States that are of relevance to the Agency's activities, to negotiate agreements with Member States and international organizations and to provide the Agency and Permanent Missions with protocol services.

Area of Activity S.2.2
Legal Advice

S/8. The aim is to provide the Agency with legal advice concerning all its activities and to assist Member States in nuclear law and regulatory matters.

S/9. Legal services and advice will continue to be provided in connection with the following: negotiation, drafting and conclusion of safeguards agreements as well as procurement and other types of agreements and contracts concluded by the Agency; the exercise by the Agency of its depository function and registration responsibilities in accordance with its Statute and other conventions and agreements; interpreting and applying agreements, rules and regulations relevant to the work of the Agency.

S/10. Legal services and advice will also be provided on different aspects of nuclear law-making. Work will continue, for example, on the establishment of a joint protocol to the Vienna and Paris Conventions on Civil Liability, on the feasibility of establishing a regime of State liability for nuclear damage, and in connection with the updating of the Nuclear Safety Standards (NUSS) documents. A compilation of bilateral, regional and multilateral agreements relating to co-operation in the field of nuclear safety is planned. Advisory services will be provided to Member States - upon request - on the enactment of their nuclear legislation, and training courses will be organized on different aspects of nuclear law.

S/11. Legal advice will be given, upon request, to the Policy-making Organs on all matters where legal opinion is required.

Area of Activity S.2.3
Management Services

S/12. The aim is to provide the Agency's management with consultation services and advice on organizational and management issues. Management Services undertake surveys and studies with special emphasis on organizational analysis, staff requirements and policy questions, and make general and specific proposals for improvements.

S. DIRECTION AND SUPPORT

Area of Activity S.2.4 Personnel Services

S/13. The aim is to provide the Agency with personnel management and staff services in order to ensure efficient utilization of human resources and fair conditions of employment.

S/14. It is planned to review and develop an optimal grading structure for the Secretariat, and to provide the staff with reasonable opportunities for career development by way of training, mobility, motivation and recognition.

S/15. Recruitment procedures will continue to be monitored with a view to shortening delays, improving selection methods and obtaining more applications from qualified women.

Area of Activity S.2.6 Budget and Finance

S/16. The aim is to develop and implement programme, budgetary and financial procedures to ensure effective financial control and the attainment of Agency programme objectives with the most economical use of available resources.

S/17. The possibilities offered by the financial information and control system which went into operation in January 1987 will be utilized to expand further the reporting of information by fund, programme and organizational structure, the aim being to improve the capability of this reporting mechanism as a management tool.

S/18. Financial control will be further adapted so that - to the extent possible - financial performance can be linked to programme performance in terms of the volume of activities carried out.

S/19. Continued efforts will be directed towards the cost-effective use of Agency resources by streamlining and simplifying administrative and operational procedures.

PROGRAMME S.2: ADMINISTRATION

Summary of main means by Area of Activity for 1989/1990

Table 44

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi-cations	Safeguards implemen-tation	Standards, regula-tions	Research & devel-opment	Admin. sup-port and management	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O											
S.2.1 External Relations	ADEX	8.0	13.0	-	-	-	-	-	-	3 336 000	-	-	-	3 336 000	
S.2.2 Legal Advice	ADLG	8.0	4.0	-	-	-	-	-	-	1 450 000	-	-	-	1 450 000	
S.2.3 Internal Audit and Management Services	ADIT	8.0	6.0	-	-	-	-	-	-	2 120 000	-	-	-	2 120 000	
S.2.4 Personnel Services	ADPR	12.0	26.0	-	-	-	-	-	-	7 818 000	-	-	-	7 818 000	
S.2.6 Budget and Finance	ADBF	21.0	45.0	-	-	-	-	-	-	9 180 000	-	-	-	9 180 000	
Programme S.2 Total		57.0	94.0	-	-	-	-	-	-	23 904 000	-	-	-	23 904 000	

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Summary of Regular Budget estimates by Area of Activity

Table 45

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure 1989		Expenditure 1990		Price 1989		Price 1990		
			increase(decr.) %	at 1988 prices	increase(decr.) %	at 1988 prices	incr. %	with price increase	incr. %	with price increase	
S.2.1 External Relations	ADEX	1 545 000	(6 000)	(0.4)	1 539 000	-	-	6.0	1 631 000	4.5	1 705 000
S.2.2 Legal Advice	ADLG	681 000	-	-	681 000	-	-	4.1	709 000	4.5	741 000
S.2.3 Internal Audit and Management Services	ADIT	890 000	100 000	11.2	990 000	-	-	4.7	1 037 000	4.5	1 083 000
S.2.4 Personnel Services	ADPR	3 943 000	(317 000)	(8.0)	3 626 000	-	-	5.7	3 834 000	3.9	3 984 000
S.2.6 Budget and Finance	ADBF	4 227 000	-	-	4 227 000	-	-	6.3	4 494 000	4.3	4 686 000
Total - Programme S.2		11 286 000	(223 000)	(2.0)	11 063 000	-	-	5.8	11 705 000	4.2	12 199 000

PROGRAMME S.3

TECHNICAL CO-OPERATION SERVICING AND CO-ORDINATION

Area of Activity S.3.1
Operations

S/20. The aim is to ensure that requests for technical assistance received from Member States are carefully appraised and prepared for approval, that implementation of technical co-operation projects proceeds smoothly and efficiently and that goods and services needed in support of technical co-operation activities are obtained without delay. To this end, close monitoring of project implementation and of the results achieved by projects will continue. In the case of large-scale projects, management plans stipulating Agency and government inputs, as well as timetables for implementation actions, will be drawn up.

S/21. It is expected that funding levels for technical co-operation will continue to increase compared with the previous biennium, the total estimated volume approaching \$90 million for 1989-90. Increases are foreseen in the number of multi-year projects, expert assignments, fellowship awards, training course participants and equipment disbursements. Regional programmes will become an increasingly important component of the programme, particularly for strengthening manpower development.

S/22. In line with the policy guidelines endorsed by the Board, efforts will be intensified to provide more timely and effective assistance. Certain measures introduced in the last biennium - such as preproject and country programming missions - will enable Member States requiring assistance in programme formulation and project planning to submit more realistic and integrated requests which take into account their priority development needs.

S/23. In co-ordinating the provision of technical assistance, strong support will be provided by, and close co-operation will be maintained with, the Agency's technical Divisions. Close co-operation will also be maintained with development agencies in donor and recipient countries and with international organizations involved in providing technical assistance. Such co-ordination involves the forward planning of programme resources, the monitoring of resource levels and their utilization, and policy matters.

S/24. By the end of 1989, the computerized technical co-operation management system, which covers all technical co-operation activities and related financial information, will enable officers involved in the support or administration of Agency technical co-operation activities to have ready access to comprehensive information through on-line retrieval. A number of other computerization projects aimed at facilitating expert recruitment and equipment procurement will become fully operational during the period 1989-90. During the same period, office automation facilities designed to expedite communication within the Agency and with other United Nations organizations will continue to be expanded and to contribute to greater efficiency in administering Agency technical co-operation programmes.

Area of Activity S.3.2Evaluation

S/25. The aim is to contribute to the further enhancement of the quality of technical assistance provided to Member States, to increase transparency and to provide an important additional tool for the management of the technical co-operation programme.

S/26. The Evaluation Section is organizationally independent of the operational elements of the Department and reports directly to the Deputy Director General for Technical Co-operation. In its day-to-day work, the Evaluation Section will continue to draw on all the resources of the Secretariat, on outside technical expertise and on national project counterparts.

S/27. Evaluation activities in 1989-90 will continue to focus on projects and programmes that are of general concern to a number of Member States in order that the lessons learned can have the broadest possible applicability. In addition, the series of country programme evaluations begun in 1987 will be further extended and given increased priority. Such evaluations examine the impact of the Agency's total programme of co-operation with a Member State with the aim of providing guidance for the future programming of Agency assistance. They also provide an opportunity for an in-depth examination of the link between the Agency's assistance and wider national development programmes. Closer co-operation with the evaluation activities of other United Nations organizations will be maintained.

PROGRAMME S.3: TECHNICAL CO-OPERATION SERVICING AND CO-ORDINATION

Summary of main means by Area of Activity for 1989/1990

Table 46

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Admin. sup- port and management	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O											
S.3.1 Operations	TCAC	43.0	68.0	-	-	-	-	-	-	-	-	-	16 263 000	-	16 263 000
S.3.2 Evaluation	TCAC	3.0	2.0	-	-	-	-	-	-	-	-	-	1 130 000	-	1 130 000
Programme S.3 Total		46.0	70.0	-	-	-	-	-	-	-	-	-	17 393 000	-	17 393 000

Summary of Regular Budget estimates by Area of Activity

Table 47

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure		1989 at 1988 prices	Expenditure		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
			increase(decr.) %	increase(decr.) %								
S.3.1 Operations	TCAC	7 398 000	105 000	1.4	7 503 000	71 000	0.9	7 574 000	5.5	7 918 000	4.4	8 345 000
S.3.2 Evaluation	TCAC	524 000	-	-	524 000	-	-	524 000	5.5	553 000	4.4	577 000
Total - Programme S.3		7 922 000	105 000	1.3	8 027 000	71 000	0.9	8 098 000	5.5	8 471 000	4.4	8 922 000

PROGRAMME S.4

GENERAL SERVICES

Area of Activity S.4.1
VIC Maintenance and Operation

S/28. The responsibility for the maintenance and operation of the VIC rests with UNIDO Buildings Management Services and the United Nations Security and Safety Services. The costs of these services are shared among the users, namely the United Nations, UNIDO and the IAEA, the Agency's share amounting to 45.5%. The main items of expenditure are shown in Table 132.

S/29. Efforts will continue to be made - in close co-operation with other users of the VIC complex - to monitor carefully the costs of the UN Security and Safety Services and of VIC maintenance and operation. As the structure of the VIC buildings and facilities are now more than 10 years old, further increases in maintenance and repair costs are expected.

S/30. No Agency manning table is given for this area of activity since all the personnel concerned are UNIDO and UN staff members.

Area of Activity S.4.2
Other General Services

S/31. The aim is to provide procurement services, supply services, engineering and technical services (at Headquarters, the laboratories in Seibersdorf and Monaco, and the Trieste Centre), records and communications services (i.e. telex, telephone including facsimile, pouch and mail), transport services and electronic services for Agency meetings; to carry out inventory checks on Agency property; to verify invoices for payment; to provide receiving, storage and dispatch services; to provide various staff services (including the operation of the VIC Commissary and the VIC Housing Service); to participate in the technical and financial management of the VIC; and to verify the Agency's financial share of VIC operating costs.

PROGRAMME S.4: GENERAL SERVICES

Summary of main means by Area of Activity for 1989/1990

Table 48

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Admin. sup- port and management	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O											
S.4.1 VIC Maintenance and Operation	ADGS	-	-	-	-	-	-	-	-	-	18 962 000	-	-	-	18 962 000
S.4.2 Other General Services	ADGS	10.0	71.0	28.0	-	-	-	-	-	-	15 235 000	-	-	-	15 235 000
Programme S.4 Total		10.0	71.0	28.0	-	-	-	-	-	-	34 197 000	-	-	-	34 197 000

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Summary of Regular Budget estimates by Area of Activity

Table 49

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure		1989 at 1988 prices	Expenditure		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
			increase(decr.) %	1988		increase(decr.) %	1990					
S.4.1 VIC Maintenance and Operation	ADGS	8 982 000	32 000	0.4	9 014 000	-	-	9 014 000	3.4	9 322 000	3.4	9 640 000
S.4.2 Other General Services	ADGS	7 030 000	(32 000)	(0.5)	6 998 000	-	-	6 998 000	6.8	7 476 000	3.8	7 759 000
Total - Programme S.4		16 012 000	-	-	16 012 000	-	-	16 012 000	4.9	16 798 000	3.6	17 399 000

PROGRAMME S.5

SPECIALIZED SERVICE ACTIVITIES

Area of Activity S.5.1
Public Information

S/32. The aim is to supply to relevant national and international authorities and non-governmental organizations, the media and members of the public who can influence public opinion, factual, non-technical information on the Agency and its activities and on nuclear-related issues of a sensitive nature and hence to contribute to increased public awareness of the use of nuclear energy for power generation and other peaceful purposes.

S/33. This objective will be achieved mainly through publications, production of audio-visual material, direct and indirect contacts with the press and the public, and the distribution of public information material.

S/34. Regular publications will comprise the following two periodicals, which are aimed at different audiences:

- The IAEA Bulletin, a quarterly magazine produced in five languages mainly for the nuclear community in Member States;
- IAEA Newsbriefs, a monthly newsletter with short reports (in English), predominantly about the Agency's work and produced mainly for the media.

S/35. Experience from recent years has demonstrated the need to strengthen the Agency's ability to provide timely and factual information material on specific issues in the field of nuclear energy. For the period 1989-90, it is planned to use temporary assistance funds for this purpose. On the basis of the experience acquired, future requirements for additional manpower will be assessed.

S/36. About 400 original pages of brochures, leaflets and booklets on selected topics will be produced annually. Press releases will be issued on specific occasions.

S/37. Lectures and briefings will be given to visiting groups of government officials, diplomats, students and officials from non-governmental organizations. Press conferences and individual interviews will be arranged for journalists. Films and videotapes will continue to be produced on topical subjects and distributed to interested parties in Member States.

S/38. Television and film teams will be assisted in their work. On specific occasions, exhibitions will be organized and presented at the Vienna International Centre and elsewhere. Five to ten students will be accepted each year in connection with their advanced studies on nuclear-related subjects and international relations. In addition, some 5000 individual requests and inquiries are answered by telephone and correspondence each year.

S. DIRECTION AND SUPPORT

Area of Activity S.5.2 International Nuclear Information System

S/39. Bibliographic data comprising approximately 100 000 references per year will continue to be collected from INIS members, converted to machine-readable form, coded by computer, copied and re-distributed to all Member States and participating international organizations twice a month. By 1990, the data base should reach 1.4 million records. In addition, INIS output will be prepared, published and distributed bi-monthly in the form of magnetic tapes, microfiches and hard copy. On-line access to the INIS data base on the Agency's computer in Vienna will continue to be provided to members on request. The feasibility of distributing INIS output on compact disk is being reviewed and appropriate guidelines will be elaborated in 1988 in co-operation with INIS Liaison Officers from Member States. If the outcome of this review is positive, distribution of INIS output on compact disks may be achieved in 1989.

S/40. INIS reference series documents, which ensure compatibility and consistency of input from INIS members, will continue to be updated and revised (approximately five revisions are issued each year).

S/41. Technical reports, theses and other documents not normally available from commercial sources will be microfilmed and made available for sale to users of the system (approximately 15 000 such documents are processed each year).

S/42. Intermediary services will be offered to those IAEA Member States which are not members of OECD to give them access to the file of computer codes available in the OECD/NEA computer bank.

S/43. Training will be provided to staff from INIS members on the preparation of input and the use of INIS output, through the organization of international and regional seminars (in alternate years) and of national seminars (at the request of Member States).

S/44. Following the successful establishment of an INIS-like data base containing information on nuclear safety research projects (currently published jointly by the Agency, OECD and CEC as "Nuclear Safety Research Abstracts"), the feasibility of computerizing the "Waste Management Research Abstracts" will be investigated. In the above activities, INIS will be responsible for information management while the various programme Divisions will be responsible for information collection and dissemination.

Area of Activity S.5.3 Radiation Protection Services

S/45. Personnel monitoring services (including results of external irradiation and internal contamination) will continue to be provided on a routine basis to the Agency's radiation workers, technical co-operation experts and, at Agency premises, to trainees from Member States.

S/46. A personnel thermoluminescence dosimetry service will continue to be made available when necessary to countries in connection with Agency-assisted projects and, when requested, to Member States which have not yet established a national service of this type.

S/47. Radiation protection training will continue to be provided for Agency radiation workers (3-4 courses per year).

S/48. An 8-week introductory course on radiation protection practices is planned each year for 6-9 fellowship holders from Member States as part of technical co-operation projects on radiation protection. About 10 fellows per year will receive on-the-job training at the VIC, the Agency's Laboratory at Seibersdorf, the Austrian Atomic Energy Research Centre and a Viennese hospital.

S/49. Advisory missions will be sent upon request to developing countries to assist them in the establishment or improvement of national radiation protection services.

S/50. Those of the above tasks which are aimed at Member States will be carried out in conjunction with Project H.1.03 (Strengthening Radiation Protection Infrastructures).

PROGRAMME S.5: SPECIALIZED SERVICE ACTIVITIES

Summary of main means by Area of Activity for 1989/1990Table 50

Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Admin. sup- port and management	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O											
S.5.1 Public Information	ADPI	5.0	8.0	-	-	-	4 174 000	-	-	-	-	-	-	-	4 174 000
S.5.2 International Nuclear Information System	NESI	16.0	27.0	-	-	4 875 000	4 876 000	-	-	-	-	-	853 000	-	10 604 000
NESI - Director's Office	NESI	1.0	2.0	-	-	-	-	-	-	448 000	-	-	-	-	448 000
S.5.3 Radiation Protection Services	NENS	a/	a/	-	-	-	-	-	-	290 000 b/	-	-	-	-	290 000
Programme S.5 Total		22.0	37.0	-	-	4 875 000	9 050 000	-	-	-	738 000	-	853 000	-	15 516 000

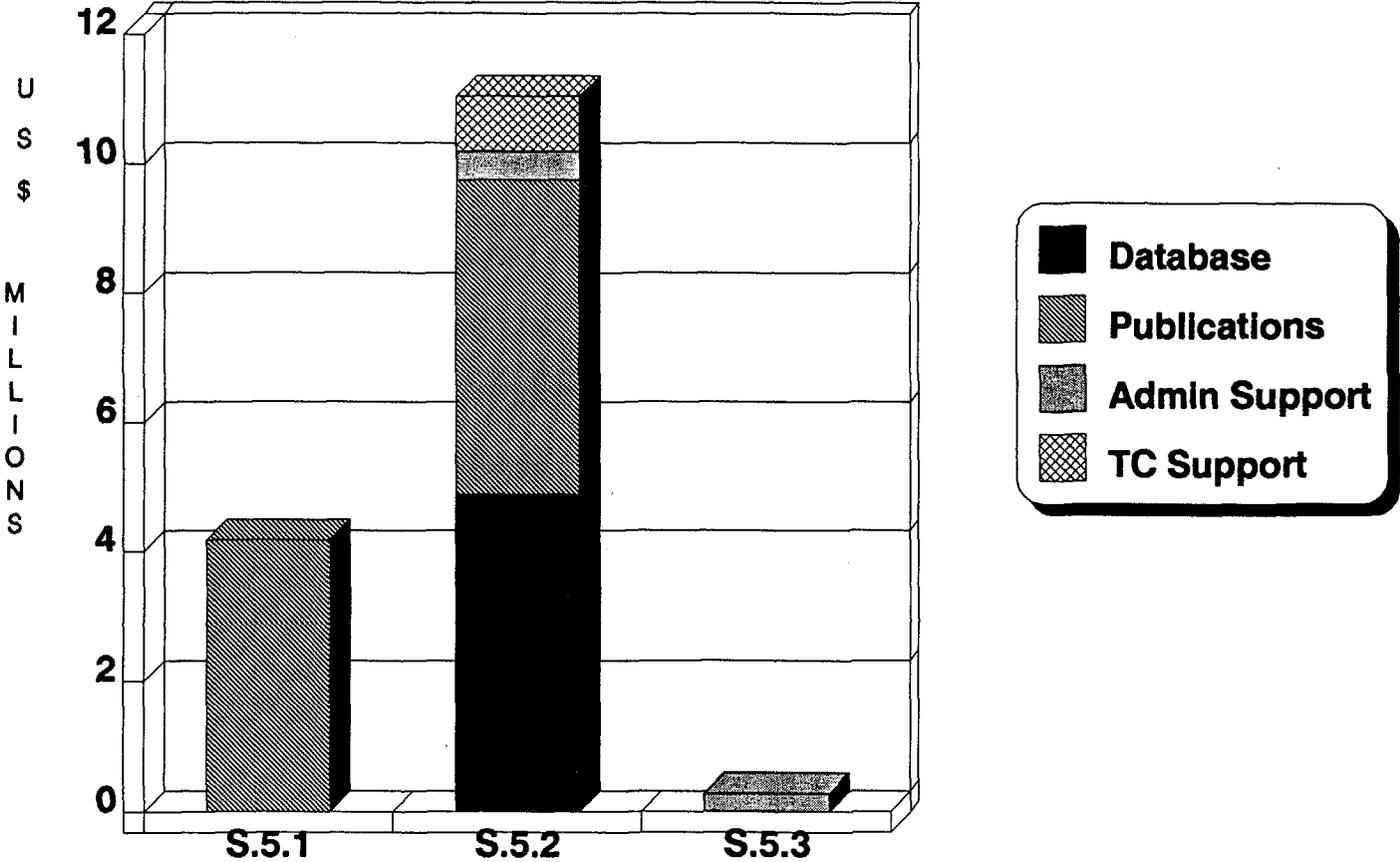
a/ See Table 52.

b/ Radiation protection services provided to the Departments of Nuclear Energy and Safety and Research and Isotopes.

S.5 Specialised Service Activities

Graph 11

Main Means by Area of Activity



PROGRAMME S.5: SPECIALIZED SERVICE ACTIVITIES

Summary of Regular Budget estimates by Area of ActivityTable 51

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure increase(decr.) %		1989 at 1988 prices	Expenditure increase(decr.) %		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
S.5.1 Public Information	ADPI	1 842 000	97 000	5.3	1 939 000	-	-	1 939 000	5.6	2 048 000	3.8	2 126 000
S.5.2 International Nuclear Information System	NESI	4 960 000	(22 000)	(0.4)	4 938 000	-	-	4 938 000	5.4	5 204 000	3.8	5 400 000
NESI- Director's Office	NESI	208 000	(1 000)	(0.5)	207 000	-	-	207 000	5.8	219 000	4.6	229 000
S.5.3 Radiation Protection Services	NENS	135 000	-	-	135 000	-	-	135 000	5.8	143 000 a/	3.4	147 000 a/
Total - Programme S.5		7 145 000	74 000	1.0	7 219 000	-	-	7 219 000	5.5	7 614 000	3.8	7 902 000

a/ Radiation protection services provided to the Departments of Nuclear Energy and Safety and Research and Isotopes.

PROGRAMME S.6

SHARED SUPPORT SERVICES

Area of Activity S.6.1
Contract Administration Services

S/51. The aim is to provide administrative services and support to the staff of the technical Divisions of the Agency in implementing the research contract programme (some 100 contracts a year) and to maintain a uniform system for the administration of all such contracts, agreements and co-ordinated research programmes.

Area of Activity S.6.2
Conferences Services and Interpretation

S/52. The aim is to provide organizational and administrative services to ensure the smooth running of Agency meetings and to provide participants at meetings with interpretation services essential for the effective exchange of information. On average, about 200 meetings are serviced and some 1800 man-days of interpretation are provided each year.

Area of Activity S.6.3
Translation and Records Services

S/53. The aim is to provide accurate and timely translation and records services for the Policy-making Organs and the scientific and technical Divisions of the Agency. Translation services will be provided to and from Arabic, Chinese, English, French, Russian and Spanish.

S/54. The volume of work is expected to remain fairly constant, at about 32 000 to 33 000 pages per year. Developments in the field of computerized translation will be kept under review, but actual work on machine translation will be discontinued since trials conducted in 1987 did not demonstrate the cost-effectiveness of translation software in the present state of the technology and within the specific context of Agency documents and publications. Efforts aimed at improving support to translators will be concentrated on increasing input and facilitating access to the computerized terminology system.

S. DIRECTION AND SUPPORT

Area of Activity S.6.4 Medical Services

S/55. The aim is to operate a medical service for the staff of all the international organizations at the VIC. The service is operated on a cost-sharing basis and administered by the Agency. It is planned to continue the health promotion programme initiated in 1986.

S/56. In an average year, there are over 25 000 consultations with nurses and doctors, more than 4000 vaccinations are administered and some 5000 urine and blood tests, 1500 X-ray examinations and 1000 electrocardiograms are performed for the staff and experts of the VIC organizations.

Area of Activity S.6.5 Library

S/57. The aim is to give support to the programmes of the VIC organizations and to Permanent Missions through the provision of a full range of library and information services.

S/58. As the Library spends 75% of its acquisitions budget on subscriptions to scientific journals and other specialized periodical literature, increasing emphasis will be placed on the identification and installation of a serials management and check-in system. This computer-assisted system will provide improved access to and control of this valuable material with the same staff resources.

Area of Activity S.6.6 Data Processing Services

S/59. The aim is to provide timely and effective data and word processing support to the Agency and to the various United Nations organizations at the VIC.

S/60. Estimates by users indicate a 10% annual increase in computer utilization, which will result in the upgrading of the installed capacity.

S/61. Efforts to reduce the backlog in the development of applications will be made by examining the increased use of software packages.

S/62. Advice and assistance will be given to all Divisions of the Agency on the applications and benefits of professional computers and office automation equipment.

Area of Activity S.6.7
Printing and Publishing

S/63. The aim is to produce and distribute publications with a view to disseminating information on the results of the Agency's scientific and technical work, to provide reproduction facilities to meet the requirements of the General Conference, the Board of Governors and the Secretariat and to operate (on a reimbursable basis) a common printing service for all United Nations Organizations at the VIC.

PROGRAMME S.6: SHARED SUPPORT SERVICES

Summary of main means by Area of Activity for 1989/1990Table 52

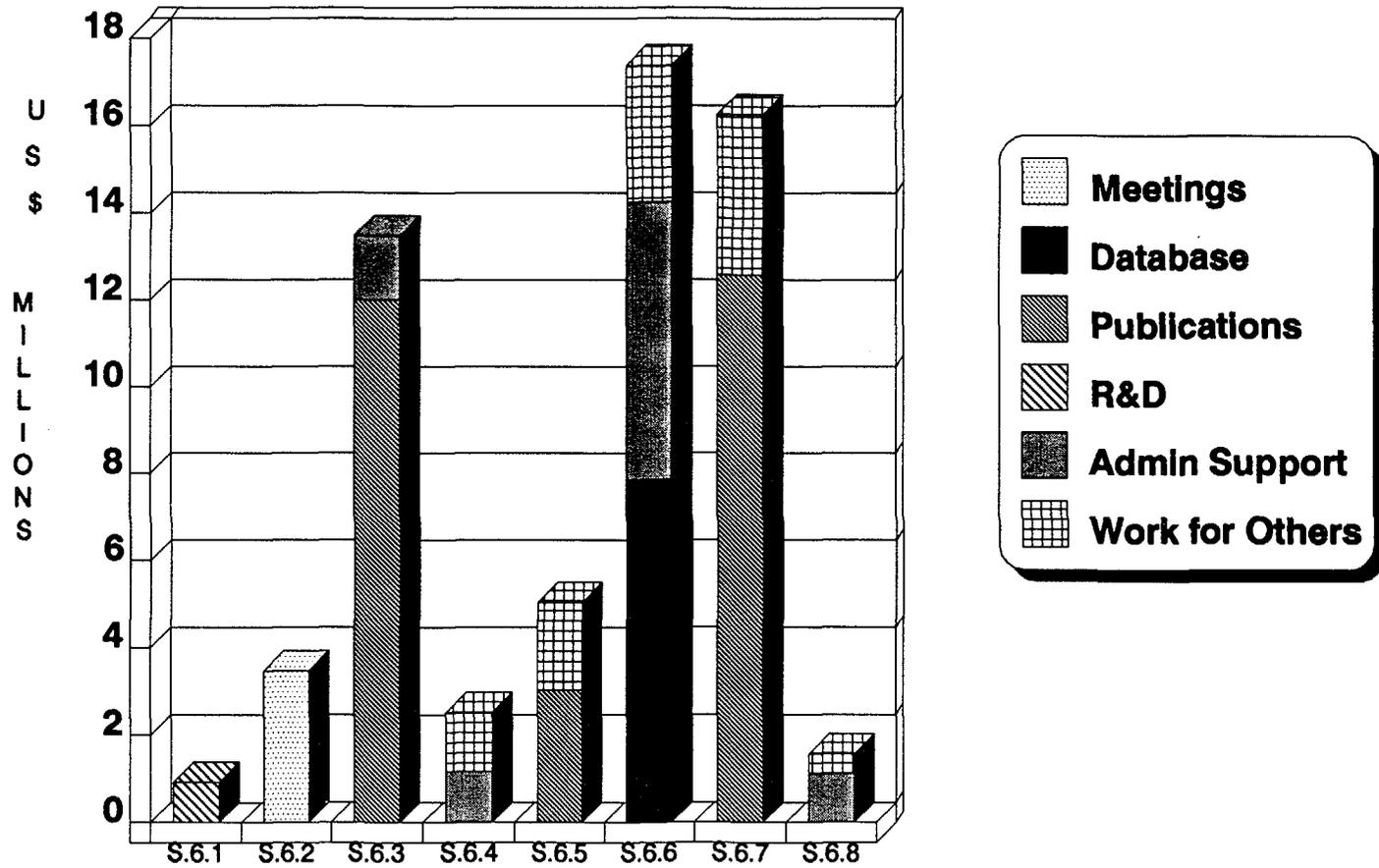
Area of Activity	Respon. Div.	Man-years (Per Year)			Major meetings	Data base	Publi- cations	Safeguards implemen- tation	Standards, regula- tions	Research & devel- opment	Admin. sup- port and management	Services to Member States	TC support	Work for others	Total Regular Budget
		P	GS	M&O											
S.6.1 Contract Administra- tion Services	DDG RI	1.0	5.0	-	-	-	-	-	-	918 000	-	-	-	-	918 000
S.6.2 Conference Services	ADEX	5.0	8.0	-	1 589 000	-	-	-	-	-	-	-	-	-	1 589 000
and Interpretation		8.0	1.0	-	1 875 000	-	-	-	-	-	-	-	-	-	1 875 000
S.6.3 Translation and Records Services	ADLA	48.0	43.0	2.0	-	-	11 997 000	-	-	-	1 488 000	-	-	-	13 485 000
S.6.4 Medical Services	ADPR	3.0	15.0	3.0	-	-	-	-	-	-	1 170 000	-	-	1 329 000	2 499 000
S.6.5 Library	NESI	5.0	10.0	-	-	-	3 016 000	-	-	-	-	-	-	2 010 000	5 026 000
S.6.6 Data Processing Services	NESI	30.0	40.0	-	-	7 841 000	-	-	-	-	6 419 000	-	-	3 151 000	17 411 000
S.6.7 Printing and Publishing	TCPU	17.0	100.0	18.0	-	-	12 588 000	-	-	-	-	-	-	3 678 000	16 266 000
S.6.8 Radiation Protection Services	NENS	3.0	5.0	-	-	-	-	-	-	-	1 130 000	-	-	433 000	1 563 000 a/
Programme S.6 Total		120.0	227.0	23.0	3 464 000	7 841 000	27 601 000	-	-	918 000	10 207 000	-	-	10 601 000	60 632 000

a/ Represents the total cost of radiation protection services including charges to the Department of Safeguards and TC projects.

S.6 Shared Support Services

Graph 12

Main Means by Area of Activity



S. DIRECTION AND SUPPORT

PROGRAMME S.6: SHARED SUPPORT SERVICES

Summary of Regular Budget estimates by Area of Activity

Table 53

Area of Activity / Programme	Respon Div.	1988 Budget	Expenditure increase(decr.) %		1989 at 1988 prices	Expenditure increase(decr.) %		1990 at 1988 prices	Price incr. %	1989 with price increase	Price incr. %	1990 with price increase
S.6.1 Contract Administration Services	DDG RI	426 000	(4 000)	(0.9)	422 000	-	-	422 000	6.6	450 000	4.0	468 000
S.6.2 Conference Services and Interpretation	ADEX	749 000	(6 000)	(0.8)	743 000	(30 000)	(4.0)	713 000	6.9	794 000	4.3	795 000
		1 012 000	(145 000)	(14.3)	867 000	58 000	6.7	925 000	2.3	887 000	4.4	988 000
S.6.3 Translation and Records Services	ADLA	6 544 000	(236 000)	(3.6)	6 308 000	(8 000)	(0.1)	6 300 000	4.6	6 600 000	4.5	6 885 000
S.6.4 Medical Services	ADPR	1 153 000	(3 000)	(0.3)	1 150 000	-	-	1 150 000	6.6	1 226 000	3.8	1 273 000
S.6.5 Library	NESI	2 525 000	(200 000)	(7.9)	2 325 000	-	-	2 325 000	5.6	2 456 000	4.7	2 570 000
S.6.6 Data Processing Services	NESI	8 265 000	(105 000)	(1.3)	8 160 000	18 000	0.2	8 178 000	4.6	8 538 000	3.7	8 873 000
S.6.7 Printing and Publishing	TCPU	8 253 000	(717 000)	(8.7)	7 536 000	(201 000)	(2.7)	7 335 000	7.3	8 083 000	4.0	8 183 000
S.6.8 Radiation Protection Services	NENS	675 000	34 000	5.0	709 000	34 000	4.8	743 000	5.8	750 000 a/	3.4	813 000 a/
Total - Programme S.6		29 602 000	(1 382 000)	(4.7)	28 220 000	(129 000)	(0.5)	28 091 000	5.5	29 784 000	4.1	30 848 000
Total: Programme S.6										29 784 000		30 848 000
Less: cross charge										1 073 000		1 100 000
Total: Shared Support Services										28 711 000		29 748 000
Allocated cost:												
to Agency programmes under the Regular Budget										22 020 000		22 822 000
to other organizations and TC projects										5 217 000		5 384 000
										27 237 000		28 206 000
Non-allocated cost:												
Agency's share of the Library b/										1 474 000		1 542 000
Total: Shared Support Services										28 711 000		29 748 000

a/ Represents total cost of radiation protection services including charges to the Department of Safeguards and TC projects.

b/ See footnote on Table 41

A N N E X E S I - III

A N N E X I

CONFERENCES, SYMPOSIA AND SEMINARS IN 1989 [1]

Within the limits of the appropriation and subject to the requirements of the individual programmes as outlined for 1989, it is planned to hold the meetings listed below. All meetings were considered by the Scientific Advisory Committee. The reference following each meeting is to the relevant paragraph in the programme.

NUCLEAR POWER AND THE FUEL CYCLE

1. Symposium on safety assessment of radioactive waste repositories C/41

NUCLEAR APPLICATIONS

2. FAO/IAEA regional seminar for Africa on improving health and reproductive efficiency of livestock through radio-immunoassay and related techniques D/26
3. FAO/IAEA regional seminar on the sterile technique for fruit fly control or eradication in Latin America D/35
4. FAO/IAEA interregional seminar on the bioconversion of agricultural residues using nuclear techniques [2] D/52
5. Regional seminar for Latin America on nuclear techniques in parasitic and communicable infections E/8
6. Seminar for Africa on organization and training in radiotherapy E/40
7. Regional seminar for Latin America on calibration procedures in Secondary Standard Dosimetry Laboratories (SSDLs) E/47
8. Seminar for developing countries on nuclear research centres in the service of environmental research; service-client-sponsor relationships E/64
9. Seminar on isotope applications in geothermics in Asia and the Pacific, Africa and the Middle East F/8

NUCLEAR SAFETY AND RADIATION PROTECTION

10. Symposium on environmental contamination following a major nuclear accident [3] H/37

- | | | |
|-----|--|------|
| 11. | Symposium on fire protection and fire-fighting at nuclear facilities [4] | I/20 |
| 12. | Regional seminar on regulatory aspects and enforcement of radiation protection | H/17 |
| 13. | Seminar on recovery operations in the event of a nuclear power plant accident | H/53 |
| 14. | Seminar on safety aspects of research reactors and critical assemblies (including topics relating to research reactor renewal and upgrading) | I/42 |

SAFEGUARDS

- | | | |
|-----|---------------------------------------|------|
| 15. | Seminar on safeguards accounting data | J/23 |
|-----|---------------------------------------|------|

DIRECTION AND SUPPORT

- | | | |
|-----|-----------------------|------|
| 16. | INIS training seminar | S/43 |
|-----|-----------------------|------|

[1] In addition, the Agency will co-operate in a Symposium on Quality in Nuclear Power Plant Operations, which will be organized by the Canadian Government, and in a Symposium on Nuclear Analytical Methods in the Life Sciences, which will be organized by the United States' National Bureau of Standards. In both cases, the Agency will participate in formulating the programme for the meeting and, as in the case of its own symposia, will subsidize the participation of nationals from developing countries.

[2] Efforts will be made to obtain extrabudgetary financing

[3] Including aspects of foodstuff contamination

[4] Postponed from 1988 under SNSP

A N N E X I I

CONFERENCES, SYMPOSIA AND SEMINARS IN 1990

A list of scientific meetings considered by the Scientific Advisory Committee is presented for the second year of the biennium 1989-90. The reference following each meeting is to the relevant paragraph in the programme.

NUCLEAR POWER AND THE FUEL CYCLE

1. Thirteenth international conference on plasma physics and controlled nuclear fusion research A/50
2. Seminar on the costs and financing of nuclear power in developing countries A/14
3. Seminar on management of quality for nuclear power projects A/27
4. Seminar on quality assurance and quality control in the design and manufacture of water reactor fuel B/26
5. Seminar on spent fuel storage - safety, engineering and and environmental aspects B/35

NUCLEAR APPLICATIONS

6. FAO/IAEA symposium on contribution of plant mutation breeding to crop improvement D/16
7. Symposium on high-dose dosimetry for radiation processing E/55
8. Symposium on nuclear techniques in the exploration and exploitation of energy and mineral resources F/20
9. Seminar on the application of nuclear techniques in the early diagnosis of cancer in developing countries E/30
10. Seminar on isotope techniques in hydrology for Africa F/17

NUCLEAR SAFETY AND RADIATION PROTECTION

- | | | |
|-----|--|------|
| 11. | Symposium on radiation protection infrastructure | H/4 |
| 12. | Symposium on balancing automation and human action in nuclear power plants | I/20 |
| 13. | Seminar on the use of incident reporting system output in nuclear power plant safety | I/38 |

DIRECTION AND SUPPORT

- | | | |
|-----|-----------------------|------|
| 14. | INIS training seminar | S/43 |
|-----|-----------------------|------|

ANNEX III

Draft resolutions

A. REGULAR BUDGET APPROPRIATIONS FOR 1989

The General Conference,

Accepting the recommendations of the Board of Governors relating to the Regular Budget of the Agency for 1989 [1],

1. Appropriates on the basis of an exchange rate of AS 12.70 to \$1.00, an amount of \$157 540 000 for the Regular Budget expenses of the Agency in 1989 as follows:

	<u>United States dollars</u>
1. Technical Assistance and Co-operation	8 471 000
2. Nuclear Energy and Safety [2]	27 715 000
3. Research and Isotopes [3]	20 941 000
4. Operational Facilities [4]	3 041 000
5. Safeguards	52 922 000
6. Policy-making Organs	6 000 000
7. Executive Management and Administration	16 435 000
8. General Services	16 798 000
	<hr/>
Sub-Total Agency Programme	152 323 000
9. Shared Support Services	5 217 000
(Cost of Work for Others)	<hr/>
TOTAL	157 540 000
	=====

the amounts in the appropriation sections to be adjusted in accordance with the adjustment formula presented in the Attachment in order to take into account the exchange rate variations during the year.

2. Decides that the foregoing appropriation shall be financed, after the deduction of revenues deriving from Work for Others (Section 9) and of other miscellaneous income of \$3 792 000 (representing \$1 979 000 plus AS 23 028 000), from contributions by Member States amounting, for an

exchange rate of AS 12.70 to \$1.00, to \$148 531 000 (\$17 216 000 plus the equivalent in US dollars of AS 1 667 702 000), in accordance with the scale of assessment fixed by the General Conference in resolution GC(XXXII)/RES/ , each contribution to be adjusted in the light of the rate applicable at the date of payment; and

3. Authorizes the Director General:

- (a) To incur expenditures additional to those for which provision is made in the Regular Budget for 1989, provided that the relevant emoluments of any staff involved and all other costs are entirely financed from revenues arising out of sales, work performed for Member States or international organizations, research grants, special contributions or other sources extraneous to the Regular Budget for 1989; and
- (b) With the prior approval of the Board of Governors, to make transfers between any of the Sections listed in paragraph 1 above.

[1] See document GC(XXXII)/

[2] For the financing of Nuclear Power, Nuclear Fuel Cycle, Nuclear Safety and Scientific and Technical Information.

[3] For the financing of Food and Agriculture, Life Sciences and Physical and Chemical Sciences.

[4] For the financing of the International Centre for Theoretical Physics (in part) and the International Laboratory of Marine Radioactivity (in part).

ATTACHMENT

ADJUSTMENT FORMULA IN US \$

1. Technical Assistance and Co-operation	680 000	+	(	98 946 000 / R)
2. Nuclear Energy and Safety [2]	3 729 000	+	(	304 616 000 / R)
3. Research and Isotopes [3]	3 309 000	+	(	223 929 000 / R)
4. Operational Facilities [4]	1 438 000	+	(	20 359 000 / R)
5. Safeguards	7 267 000	+	(	579 822 000 / R)
6. Policy-making Organs	497 000	+	(	69 886 000 / R)
7. Executive Management and Administration	1 714 000	+	(	186 962 000 / R)
8. General Services	561 000	+	(	206 210 000 / R)
<hr style="border: 0.5px solid black;"/>				
Sub-Total Agency Programme	19 195 000	+	(	1 690 730 000 / R)
9. Shared Support Services (Cost of Work for Others)	498 000	+	(	59 932 000 / R)
<hr style="border: 0.5px solid black;"/>				
TOTAL	19 693 000	+	(	1 750 662 000 / R)
<hr style="border: 0.5px dashed black;"/>				

Note: R is the average United Nations schilling-to-dollar exchange rate which will be experienced during 1989.

[2-4] See footnotes on preceding page.

B. TECHNICAL ASSISTANCE AND CO-OPERATION FUND ALLOCATION FOR 1989

The General Conference,

Accepting the recommendation of the Board of Governors relating to the target for voluntary contributions to the Agency's Technical Assistance and Co-operation Fund for 1989 [1];

1. Decides that for 1989 the target for voluntary contributions to the Technical Assistance and Co-operation Fund shall be \$42 000 000;
2. Notes that funds from other sources, estimated at \$1 000 000 are expected to be available for that programme;
3. Allocates the amount of \$43 000 000 for the Agency's Technical Assistance and Co-operation Fund for 1989; and
4. Urges all Member States to make voluntary contributions for 1989 in accordance with Article XIV.F of the Statute, with paragraph 2 of its Resolution GC(V)/RES/100 as amended by Resolution GC(XV)/RES/286 or with paragraph 3 of the former Resolution, as appropriate.

C. THE WORKING CAPITAL FUND IN 1989

The General Conference,

Accepting the recommendations of the Board of Governors relating to the Agency's Working Capital Fund in 1989 [2];

1. Approves a level of \$4 000 000 for the Agency's Working Capital Fund in 1989;
2. Decides that the Fund shall be financed, administered and used in 1989 in accordance with the relevant provisions of the Agency's Financial Regulations [3];
3. Authorizes the Director General to make advances from the Fund:
 - (a) Not exceeding \$25 000 at any time, to finance temporarily projects or activities of a strictly self-liquidating character which will not necessitate an increase in the Fund in future years; and
 - (b) With the prior approval of the Board of Governors, unless in his opinion the situation requires immediate action before such approval can be obtained, to meet the cost incurred by the Agency in organizing and rendering emergency assistance to Member States in connection with radiation accidents, up to \$50 000 in each case; and
4. Requests the Director General to submit to the Board statements of advances made from the Fund under the authority given in paragraph 3 above.

[1] See Document GC (XXXII)/ , para of the Introduction.

[2] See Document GC(XXXII)/ , para of the Introduction.

[3] INFCIRC/8/Rev.1 and Mod.1.

P A R T I I

M A N A G E M E N T P L A N

THE REGULAR BUDGET

By appropriation section

Table 54

	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
1. Technical Assistance and Co-operation	7 071 437	7 922 000	105 000	1.3	8 027 000	71 000	0.9	8 098 000	5.5	8 471 000	4.4	8 922 000
2. Nuclear Power	3 850 403	5 073 000	15 000	0.3	5 088 000	(8 000)	(0.2)	5 080 000	3.7	5 275 000	3.6	5 459 000
Nuclear Fuel Cycle	3 870 478	5 008 000	(53 000)	(1.1)	4 955 000	(137 000)	(2.8)	4 818 000	3.7	5 137 000	3.5	5 173 000
Nuclear Safety	8 409 766	10 214 000	(1 021 000)	(10.0)	9 193 000	209 000	2.3	9 402 000	4.0	9 563 000	3.7	10 135 000
Scientific and Technical Information	6 551 201	7 353 000	(27 000)	(0.4)	7 326 000	-	-	7 326 000	5.7	7 740 000	3.9	8 046 000
Nuclear Energy and Safety	22 681 848	27 648 000	(1 086 000)	(3.9)	26 562 000	64 000	0.2	26 626 000	4.3	27 715 000	3.8	28 813 000
3. Food and Agriculture	6 876 821	7 622 000	28 000	0.4	7 650 000	(124 000)	(1.6)	7 526 000	4.8	8 015 000	3.8	8 189 000
Life Sciences	3 840 918	4 391 000	(309 000)	(7.0)	4 082 000	(39 000)	(1.0)	4 043 000	4.1	4 249 000	3.8	4 370 000
Physical and Chemical Sciences	7 074 755	8 238 000	48 000	0.6	8 286 000	(184 000)	(2.2)	8 102 000	4.7	8 677 000	4.0	8 822 000
Research and Isotopes	17 792 494	20 251 000	(233 000)	(1.2)	20 018 000	(347 000)	(1.7)	19 671 000	4.6	20 941 000	3.9	21 381 000
4. International Centre for Theoretical Physics	1 245 488	1 262 000	(61 000)	(4.8)	1 201 000	-	-	1 201 000	5.1	1 262 000	5.0	1 325 000
International Laboratory of Marine Radioactivity	1 634 087	1 696 000	(11 000)	(0.6)	1 685 000	(10 000)	(0.6)	1 675 000	5.6	1 779 000	4.1	1 841 000
Operational Facilities	2 879 575	2 958 000	(72 000)	(2.4)	2 886 000	(10 000)	(0.3)	2 876 000	5.4	3 041 000	4.4	3 166 000
5. Safeguards	43 792 680	49 493 000	1 501 000	3.0	50 994 000	2 304 000	4.5	53 298 000	3.8	52 922 000	3.8	57 432 000
6. Policy-making Organs	5 003 459	5 725 000	-	-	5 725 000	-	-	5 725 000	4.8	6 000 000	4.3	6 257 000
7. Executive Management Administration	2 256 600	2 674 000	(107 000)	(4.0)	2 567 000	-	-	2 567 000	4.5	2 682 000	4.2	2 794 000
Executive Managem. and Administration	11 997 793	13 128 000	(126 000)	(1.0)	13 002 000	-	-	13 002 000	5.8	13 753 000	4.1	14 325 000
8. General Services	15 416 906	16 012 000	-	-	16 012 000	-	-	16 012 000	4.9	16 798 000	3.6	17 399 000
Total Agency Programmes	128 892 792	145 811 000	(18 000)	0.0	145 793 000	2 082 000	1.4	147 875 000	4.5	152 323 000	3.9	160 489 000
9. Shared Support Services (Cost of work for others)	4 442 200	5 183 000	(259 000)	(5.0)	4 924 000	(34 000)	(0.7)	4 890 000	6.0	5 217 000	3.9	5 384 000
TOTAL	133 334 992	150 994 000	(277 000)	(0.2)	150 717 000	2 048 000	1.4	152 765 000	4.5	157 540 000	3.9	165 873 000

THE REGULAR BUDGET

By Department

Table 55

191

	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
1. Director General and Secretariat of the Policy-making Organs	5 942 213	6 919 000	(104 000)	(1.5)	6 815 000	-	-	6 815 000	4.7	7 133 000	4.2	7 437 000
2. Department of Technical Co-operation	7 475 930	8 242 000	108 000	1.3	8 350 000	71 000	0.9	8 421 000	5.5	8 812 000	4.4	9 276 000
3. Department of Nuclear Energy and Safety	23 040 773	28 039 000	(1 086 000)	(3.9)	26 953 000	64 000	0.2	27 017 000	4.4	28 128 000	3.7	29 242 000
4. Department of Research and Isotopes	20 910 264	23 584 000	(310 000)	(1.3)	23 274 000	(357 000)	(1.5)	22 917 000	4.7	24 369 000	4.0	24 952 000
5. Department of Safeguards	43 792 680	49 493 000	1 501 000	3.0	50 994 000	2 304 000	4.5	53 298 000	3.8	52 922 000	3.8	57 432 000
5. Department of Administration	27 730 932	29 534 000	(127 000)	(0.4)	29 407 000	-	-	29 407 000	5.3	30 959 000	3.8	32 150 000
Total Agency Programmes	128 892 792	145 811 000	(18 000)	0.0	145 793 000	2 082 000	1.4	147 875 000	4.5	152 323 000	3.9	160 489 000
7. Shared Support Services including cost of work for others	25 931 757	28 517 000	(1 321 000)	(4.6)	27 196 000	(119 000)	(0.4)	27 077 000	5.6	28 711 000	4.0	29 748 000
Less: Amount of services charged to Agency programmes	21 489 557	23 334 000	(1 062 000)	(4.6)	22 272 000	(85 000)	(0.4)	22 187 000	5.5	23 494 000	4.1	24 364 000
Cost of work for others	4 442 200	5 183 000	(259 000)	(5.0)	4 924 000	(34 000)	(0.7)	4 890 000	6.0	5 217 000	3.9	5 384 000
Total Regular Budget	133 334 992	150 994 000	(277 000)	(0.2)	150 717 000	2 048 000	1.4	152 765 000	4.5	157 540 000	3.9	165 873 000

THE REGULAR BUDGET

By item of expenditure

Table 56

Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	33 721 138	40 779 000	184 000	0.5	40 963 000	1 725 000	4.2	42 688 000	2.5	41 989 000	5.0	45 944 000
Temporary assistance - P	1 193 042	1 122 100	(101 200)	(9.0)	1 020 900	(329 000)	(32.2)	691 900	1.5	1 036 100	4.0	730 300
Salaries - established posts - GS & M&O	17 296 500	18 400 000	(35 000)	(0.2)	18 365 000	127 000	0.7	18 492 000	10.5	20 295 000	4.0	21 252 000
Temporary assistance - GS & M&O	1 020 509	907 200	(368 400)	(40.6)	538 800	(52 000)	(9.7)	486 800	9.0	587 400	3.0	546 600
Common staff costs	17 286 700	20 081 200	316 600	1.6	20 397 800	491 800	2.4	20 889 600	6.5	21 731 300	4.7	23 282 800
Overtime	210 997	233 800	4 000	1.7	237 800	1 000	0.4	238 800	9.1	259 400	2.8	267 700
Sub-total: Staff costs	70 728 886	81 523 300	-	-	81 523 300	1 963 800	2.4	83 487 100	5.4	85 898 200	4.6	92 023 400
Travel	9 695 414	10 572 900	1 407 200	13.3	11 980 100	325 300	2.7	12 305 400	1.0	12 100 300	1.0	12 552 400
Representation and hospitality	134 260	176 500	(13 200)	(7.5)	163 300	10 000	6.1	173 300	1.5	165 800	1.6	178 700
Training	417 800	513 700	(106 900)	(20.8)	406 800	(200 000)	(49.2)	206 800	1.0	410 800	4.1	217 500
Experts	106 534	1 139 500	(364 100)	(32.0)	775 400	17 600	2.3	793 000	1.0	783 200	1.0	809 000
Equipment: leased or rented	328 938	496 000	72 200	14.6	568 200	2 000	0.4	570 200	1.4	576 000	1.9	589 000
Equipment: purchased (construction)	4 676 359	4 839 200	(158 900)	(3.3)	4 680 300	1 000	-	4 681 300	1.6	4 757 000	1.6	4 834 000
Supplies and materials	3 020 484	3 299 300	(93 100)	(2.8)	3 206 200	(300)	-	3 205 900	2.1	3 272 200	2.0	3 337 300
General operating expenses	12 746 614	13 721 300	33 100	0.2	13 754 400	76 800	0.6	13 831 200	3.5	14 236 100	3.5	14 816 100
Contracts	1 149 409	1 043 000	262 000	25.1	1 305 000	7 000	0.5	1 312 000	1.0	1 318 000	1.0	1 339 000
Research and technical contracts	2 258 936	2 728 000	81 000	3.0	2 809 000	(93 000)	(3.3)	2 716 000	2.6	2 881 000	2.5	2 855 000
Miscellaneous	2 139 601	2 424 300	(75 300)	(3.1)	2 349 000	56 800	2.4	2 405 800	3.5	2 430 400	3.4	2 573 600
Sub-total: Other direct costs	36 674 349	40 953 700	1 044 000	2.5	41 997 700	203 200	0.5	42 200 900	2.2	42 930 800	2.3	44 101 600
Conference services	660 603	749 000	(6 000)	(0.8)	743 000	(30 000)	(4.0)	713 000	6.9	794 000	4.3	795 000
Interpretation services	901 564	1 012 000	(145 000)	(14.3)	867 000	58 000	6.7	925 000	2.3	887 000	4.4	988 000
Translation and records services	5 809 015	6 483 000	(227 000)	(3.5)	6 256 000	(10 000)	(0.2)	6 246 000	4.6	6 546 000	4.5	6 827 000
Printing and publishing services	5 833 335	6 473 000	(724 000)	(11.2)	5 749 000	(202 000)	(3.5)	5 547 000	7.3	6 169 000	4.1	6 197 000
Data processing services	5 451 645	5 784 000	10 000	0.2	5 794 000	65 000	1.1	5 859 000	4.6	6 063 000	3.7	6 358 000
Contract administration	496 364	426 000	(4 000)	(0.9)	422 000	-	-	422 000	6.6	450 000	4.0	468 000
Other services a/	2 337 031	2 407 000	34 000	1.4	2 441 000	34 000	1.4	2 475 000	5.9	2 585 000	4.2	2 731 000
Sub-total: Shared costs	21 489 557	23 334 000	(1 062 000)	(4.6)	22 272 000	(85 000)	(0.4)	22 187 000	5.5	23 494 000	4.1	24 364 000
Agency Programmes	128 892 792	145 811 000	(18 000)	-	145 793 000	2 082 000	1.4	147 875 000	4.5	152 323 000	3.9	160 489 000
Cost of work for others	4 442 200	5 183 000	(259 000)	(5.0)	4 924 000	(34 000)	(0.7)	4 890 000	6.0	5 217 000	3.9	5 384 000
Total Regular Budget	133 334 992	150 994 000	(277 000)	(0.2)	150 717 000	2 048 000	1.4	152 765 000	4.5	157 540 000	3.9	165 873 000

a/ Included here are Medical Services, Library Services and Radiation Protection Services.

Shared Support Services

Table 57

Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	6 187 856	7 296 000	(444 000)	(6.1)	6 852 000	(46 000)	(0.7)	6 806 000	2.5	7 023 000	5.0	7 326 000
Temporary assistance - P	734 457	980 900	(225 900)	(23.0)	755 000	54 000	7.2	809 000	1.5	766 300	4.0	854 000
Salaries - established posts - GS & M&O	6 451 632	6 754 000	64 000	0.9	6 818 000	(24 000)	(0.4)	6 794 000	10.5	7 533 000	4.0	7 808 000
Temporary assistance - GS & M&O	558 264	379 500	(86 900)	(22.9)	292 600	-	-	292 600	9.0	318 900	3.0	328 500
Common staff costs	4 241 932	4 823 900	(75 200)	(1.6)	4 748 700	(24 000)	(0.5)	4 724 700	7.5	5 105 100	4.4	5 304 800
Overtime	73 860	69 300	9 800	14.1	79 100	-	-	79 100	9.0	86 200	2.9	88 700
Sub-total: Staff costs	18 248 001	20 303 600	(758 200)	(3.7)	19 545 400	(40 000)	(0.2)	19 505 400	6.6	20 832 500	4.4	21 710 000
Travel	165 834	51 600	5 800	11.2	57 400	(2 200)	(3.8)	55 200	0.9	57 900	1.3	56 400
Representation and hospitality	733	2 100	-	-	2 100	-	-	2 100	-	2 100	4.8	2 200
Training	41 780	87 500	15 800	18.1	103 300	-	-	103 300	1.0	104 300	4.1	108 600
Experts	62 609	22 300	37 700	169.1	60 000	-	-	60 000	1.0	60 600	1.0	61 200
Equipment: leased or rented	2 237 877	2 471 600	(389 300)	(15.8)	2 082 300	44 000	2.1	2 126 300	2.9	2 142 000	2.9	2 251 000
Equipment: purchased (construction)	542 368	503 600	(247 300)	(49.1)	256 300	8 000	3.1	264 300	0.7	258 000	1.8	271 000
Supplies and materials	2 240 222	2 470 800	(404 000)	(16.4)	2 066 800	(89 800)	(4.3)	1 977 000	3.3	2 135 700	3.4	2 111 600
General operating expenses	1 747 282	2 284 400	(18 800)	(0.8)	2 265 600	(43 000)	(1.9)	2 222 600	2.8	2 329 400	2.8	2 349 000
Contracts	528 919	173 000	504 800	291.8	677 800	5 000	0.7	682 800	4.5	708 000	4.6	746 000
Research and technical contracts	-	82 000	(77 000)	(93.9)	5 000	-	-	5 000	-	5 000	-	5 000
Miscellaneous	116 132	64 500	9 500	14.7	74 000	(1 000)	(1.4)	73 000	2.0	75 500	2.1	76 000
Sub-total: Other direct costs	7 683 756	8 213 400	(562 800)	(6.9)	7 650 600	(79 000)	(1.0)	7 571 600	3.0	7 878 500	3.1	8 038 000
Translation and records services	39 842	61 000	(9 000)	(14.8)	52 000	2 000	3.8	54 000	3.8	54 000	3.5	58 000
Printing and publishing services	112 375	103 000	(1 000)	(1.0)	102 000	1 000	1.0	103 000	6.9	109 000	2.6	113 000
Data processing services	750 200	921 000	(51 000)	(5.5)	870 000	(13 000)	(1.5)	857 000	4.6	910 000	3.6	929 000
Sub-total: Shared costs	902 417	1 085 000	(61 000)	(5.6)	1 024 000	(10 000)	(1.0)	1 014 000	4.8	1 073 000	3.5	1 100 000
T O T A L	26 834 174	29 602 000	(1 382 000)	(4.7)	28 220 000	(129 000)	(0.5)	28 091 000	5.5	29 784 000	4.1	30 848 000
Less: Cross-Charge (above)	902 417	1 085 000	(61 000)	(5.6)	1 024 000	(10 000)	(1.0)	1 014 000	4.8	1 073 000	3.5	1 100 000
Total Shared Support Services	25 931 757	28 517 000	(1 321 000)	(4.6)	27 196 000	(119 000)	(0.4)	27 077 000	5.6	28 711 000	4.0	29 748 000
Cost of work for others	4 442 200	5 183 000	(259 000)	(5.0)	4 924 000	(34 000)	(0.7)	4 890 000	6.0	5 217 000	3.9	5 384 000
Total paid by Agency under Shared Support Services	21 489 557	23 334 000	(1 062 000)	(4.6)	22 272 000	(85 000)	(0.4)	22 187 000	5.5	23 494 000	4.1	24 364 000

Manning Table for 1989

Table 58

	DG	DDG	D	P-5	P-4	P-3	P-2	P-1	Sub-Total	GS	M&O	Total
Office of the Director General	1	-	1	1	-	-	1	-	4	4	-	8
Secretariat of the Policy-making Organs	-	-	1	1	-	1	-	-	3	3	-	6
Sub-total	1	-	2	2	-	1	1	-	7	7	-	14
Department of Technical Co-operation a/	-	1	-	-	-	1	-	-	2	2	-	4
Division of Technical Assistance and Co-operation	-	-	2	11	11	16	5	1	46	70	-	116
Sub-total	-	1	2	11	11	17	5	1	48	72	-	120
Department of Nuclear Energy and Safety	-	1	-	-	-	1	-	1	3	2	-	5
Division of Nuclear Power	-	-	1	10	6	5	1	-	23	13	-	36
Division of Nuclear Fuel Cycle	-	-	1	7	12	1	-	-	21	13	-	34
Division of Nuclear Safety b/	-	-	1	20	15	2	-	-	38	26	-	64
Division of Scientific and Technical Information c/	-	-	1	3	6	7	-	1	18	33	-	51
Sub-total	-	1	4	40	39	16	1	2	103	87	-	190
Department of Research and Isotopes	-	1	-	-	-	1	-	-	2	2	-	4
Division of Food and Agriculture d/	-	-	-	6	7	2	2	-	17	8	-	25
Division of Life Sciences	-	-	1	4	8	2	-	-	15	10	-	25
Division of Physical and Chemical Sciences	-	-	1	7	11	5	3	-	27	18	-	45
The Agency's Laboratory	-	-	1	3	10	7	6	1	28	58	25	111
International Laboratory of Marine Radioactivity	-	-	1	2	1	1	3	1	9	16	-	25
International Centre for Theoretical Physics	-	-	1	5	3	1	1	-	11	25	-	36
Sub-total	-	1	5	27	40	19	15	2	109	137	25	271
Department of Safeguards	-	1	-	-	-	-	-	-	1	2	-	3
Division of Operations A	-	-	1	13	25	35	-	-	74	31	-	105
Division of Operations B	-	-	1	11	22	23	-	-	57	30	-	87
Division of Operations C	-	-	1	12	26	26	-	-	65	37	-	102
Division of Development e/	-	-	1	11	19	2	-	-	33	34	-	67
Division of Information Treatment f/	-	-	1	3	12	5	4	4	29	40	-	69
Division of Evaluation g/	-	-	1	6	13	2	-	-	22	15	-	37
Division of Standardization h/	-	-	1	4	5	1	1	-	12	14	-	26
Sub-total	-	1	7	60	122	94	5	4	293	203	-	496
Department of Administration	-	1	-	1	-	1	-	-	3	2	-	5
Office of Internal Audit and Management	-	-	-	2	3	2	1	-	8	6	-	14
Division of Budget and Finance	-	-	1	4	5	6	5	-	21	45	-	66
Division of General Services	-	-	1	2	3	1	2	1	10	71	28	109
Division of External Relations	-	-	2	3	2	1	-	-	8	13	-	21
Division of Public Information	-	-	1	1	1	1	1	-	5	8	-	13
Legal Division	-	-	1	3	2	1	1	-	8	4	-	12
Division of Personnel	-	-	1	2	3	4	2	-	12	26	-	38
Sub-total	-	1	7	18	19	17	12	1	75	175	28	278
Shared Support Services	-	-	-	-	1	-	-	-	1	5	-	6
Contract Administration Services	-	-	-	1	-	1	3	-	5	8	-	13
Conference Services	-	-	-	1	4	3	-	-	8	1	-	9
Interpretation	-	-	1	6	14	27	-	-	48	43	2	93
Translation and Records Services	-	-	1	-	2	-	-	-	3	15	3	21
Medical Services	-	-	-	1	-	2	2	-	5	10	-	15
Library	-	-	-	3	8	11	6	2	30	40	-	70
Data Processing Services	-	-	1	2	-	5	9	-	17	100	18	135
Printing and Publishing Services	-	-	-	1	-	2	-	-	3	5	-	8
Radiation Protection Services	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total	-	-	3	15	29	51	20	2	120	227	23	370
TOTAL	1	5	30	173	260	215	59	12	755	908	76	1 739

a/ The Programme Co-ordination Section and the Evaluation Section which report to the Deputy Director General are shown together with the Division of Technical Assistance and Co-operation.

b/ Excluding Radiation Protection Services which is shown under Shared Support Services.

c/ Excluding Data Processing Services and Library which are shown under Shared Support Services.

Full titles of the respective Divisions are:

d/ Joint FAO/IAEA Division of Isotope and Radiation Applications of Atomic Energy for Food and Agricultural Development

e/ Division of Development and Technical Support

f/ Division of Safeguards Information Treatment

g/ Division of Safeguards Evaluation

h/ Division of Standardization, Training and Administrative Support

Summary of manpower by grade of post and by Department

Table 59

Grade of post	Number of established posts						1989
	1987 Adjusted	1988	1988 Adjusted	Change			
				New posts	Reclassi- fications		
DG	1	1	1	-	-	1	
DDG	5	5	5	-	-	5	
D	30	30	30	-	-	30	
P-5	168	169	169	3	1	173	
P-4	253	256	256	5	(1)	260	
P-3	204	207	207	8	-	215	
P-2	57	59	59	-	-	59	
P-1	17	13	13	-	(1)	12	
Sub-total	735	740	740	16 x/	(1)	755	
GS	876	898	898	9	1	908	
M&O	73	76	76	-	-	76	
TOTAL	1 684	1 714	1 714	25	-	1 739	

	1987 Adjusted	1988	1988 Adjusted	Change			1989
				P	GS	M&O	
Department:							
Office of the Director General	14	14	14	-	-	-	14
Department of Technical Co-operation	115	117	118	-	2	-	120
Department of Nuclear Energy and Safety	186	190	190	-	-	-	190
Department of Research and Isotopes	269	271	271	-	-	-	271
Department of Safeguards	471	476	476	16 x/	4	-	496
Department of Administration	272	278	278	-	-	-	278
Shared Support Services (Agency posts)	357	368	367	(1)	4	-	370
TOTAL	1 684	1 714	1 714	15	10	-	1 739
Extrabudgetary posts:							
Common printing services	4	3	3	-	-	-	3
Library	13	13	14	-	-	-	14
TOTAL	17	16	17	-	-	-	17

x/ Five P positions in the Department of Safeguards will not be filled in 1989.
See Introduction, para. 57.

New posts for 1989

Table 60

	DG	DDG	D	P-5	P-4	P-3	P-2	P-1	Sub-Total	GS	M&O	Total
<u>Department of Technical Co-operation a/</u>												
Division of Technical Assistance and Co-operation	-	-	-	-	-	-	-	-	-	2	-	2
Sub-total	-	-	-	-	-	-	-	-	-	2	-	2
<u>Department of Safeguards</u>												
Division of Operations A	-	-	-	1	2	4	-	-	7	1	-	8
Division of Operations B	-	-	-	-	3	3	-	-	6	2	-	8
Division of Operations C	-	-	-	1	-	-	-	-	1	-	-	1
Division of Development e/	-	-	-	-	-	-	-	-	-	1	-	1
Division of Information Treatment f/	-	-	-	1	-	1	-	-	2	-	-	2
Sub-total	-	-	-	3	5	8	-	-	16	4	-	20
<u>Shared Support Services</u>												
Translation and Records Services	-	-	-	-	-	-	-	-	-	1	-	1
Data Processing Services	-	-	-	-	-	-	-	-	-	2	-	2
Sub-total	-	-	-	-	-	-	-	-	-	3	-	3
TOTAL	-	-	-	3	5	8	-	-	16	9	-	25

a/ e/ and f/ see footnotes on Table 58.

ADDITIONAL PROFESSIONAL POSTS IN 1989

Department of Safeguards

Divisions of Operations (A), (B) and (C)

Seventeen additional posts for safeguards inspectors are required for 1989 in order to increase the number of man-days at facilities from 10 000 in 1988 to 11 000 in 1989 and thus maintain the current level of assurance. However, a maximum of fourteen additional posts are foreseen for inclusion in the manning table, with five of these blocked for 1989. The number of man-days at facilities is now expected to be in the region of 10 600 with a consequent reduction in inspection capability.

Division of Safeguards Information Treatment

Owing to the increasing use of computers in safeguards, one additional P-5 post is required for a Section Head/Group Leader to manage the development of complex computer systems for safeguards field applications.

One additional post is needed for a computer analyst/programmer in the personal computer systems unit to develop computerized support systems for safeguards inspectors.

ADDITIONAL GENERAL SERVICE POSTS IN 1989

Department of Technical Co-operation

One GS post for a fellowship clerk is needed to cope with the additional workload. 2 GS

One additional GS post for a data entry clerk/secretary is required for the Programme Co-ordination Section.

Department of Safeguards

Divisions of Operations (A), (B) and (C)

In view of the increased workload in the Divisions of Operations, one additional GS post is needed for an inspection data clerk, and two posts for secretaries. 3 GS

Division of Development and Technical Support

One additional GS post is required for an instrument technician to carry out the monitoring and repair of the increasing amount of safeguards equipment. 1 GS

Shared Support Services

Translation and Records Services

One additional GS post is required for a secretary. There is a permanent need for secretarial assistance which cannot be solved on a temporary basis. 1 GS

Data Processing Services

Two additional GS posts will be needed for computer operators. As the computer is run on three shifts a day, there is a long-term need for these operators which cannot be met through temporary measures. 2 GS

Reclassification of existing posts

Table 61

	DG	DDG	D	P-5	P-4	P-3	P-2	P-1	Sub-Total	GS	M&O	Total
Department of Technical Co-operation a/												
Division of Technical Assistance and Co-operation	-	-	-	1	(1)	-	-	-	-	-	-	-
Sub-total	-	-	-	1	(1)	-	-	-	-	-	-	-
Shared Support Services												
Data Processing Services	-	-	-	-	-	-	-	(1)	(1)	1	-	-
Sub-total	-	-	-	-	-	-	-	(1)	(1)	1	-	-
TOTAL	-	-	-	1	(1)	-	-	(1)	(1)	1	-	-

a/ see footnote on Table 58.

RECLASSIFICATION OF POSTS IN 1989

Department of Technical Co-operation

One P-4 to P-5 (Regional Projects Co-ordinator)

1 P-5

In view of the responsibilities and duties of this post which involves the co-ordination of regional projects in Latin America, it is properly classified at the P-5 level under the ICSC Master Standard.

Shared Support Services

Data Processing Services

One P-1 to G-7

One GS post is required for an engineering assistant. It is proposed to downgrade a vacant P-1 post to the GS level, to accommodate this need.

1 G-7

Adjusted Manning Table for 1988

Table 62

	DG	DDG	D	P-5	P-4	P-3	P-2	P-1	Sub-Total	GS	M&O	Total
Office of the Director General	1	-	1	1	-	-	1	-	4	4	-	8
Secretariat of the Policy-making Organs	-	-	1	1	-	1	-	-	3	3	-	6
Sub-total	1	-	2	2	-	1	1	-	7	7	-	14
Department of Technical Co-operation a_/	-	1	-	-	-	1	-	-	2	2	-	4
Division of Technical Assistance and Co-operation	-	-	2	10	12	16	5	1	46	68	-	114
Sub-total	-	1	2	10	12	17	5	1	48	70	-	118
Department of Nuclear Energy and Safety	-	1	-	-	-	1	-	1	3	2	-	5
Division of Nuclear Power	-	-	1	10	6	5	1	-	23	13	-	36
Division of Nuclear Fuel Cycle	-	-	1	7	12	1	-	-	21	13	-	34
Division of Nuclear Safety b_/	-	-	1	20	15	2	-	-	38	26	-	64
Division of Scientific and Technical Information c_/	-	-	1	3	6	7	-	1	18	33	-	51
Sub-total	-	1	4	40	39	16	1	2	103	87	-	190
Department of Research and Isotopes	-	1	-	-	-	1	-	-	2	2	-	4
Division of Food and Agriculture d_/	-	-	-	6	7	2	2	-	17	8	-	25
Division of Life Sciences	-	-	1	4	8	2	-	-	15	10	-	25
Division of Physical and Chemical Sciences	-	-	1	7	11	5	3	-	27	18	-	45
The Agency's Laboratory	-	-	1	3	10	7	6	1	28	58	25	111
International Laboratory of Marine Radioactivity	-	-	1	2	1	1	3	1	9	16	-	25
International Centre for Theoretical Physics	-	-	1	5	3	1	1	-	11	25	-	36
Sub-total	-	1	5	27	40	19	15	2	109	137	25	271
Department of Safeguards	-	1	-	-	-	-	-	-	1	2	-	3
Division of Operations A	-	-	1	12	23	31	-	-	67	30	-	97
Division of Operations B	-	-	1	11	19	20	-	-	51	28	-	79
Division of Operations C	-	-	1	11	26	26	-	-	64	37	-	101
Division of Development e_/	-	-	1	11	19	2	-	-	33	33	-	66
Division of Information Treatment f_/	-	-	1	2	12	4	4	4	27	40	-	67
Division of Evaluation g_/	-	-	1	6	13	2	-	-	22	15	-	37
Division of Standardization h_/	-	-	1	4	5	1	1	-	12	14	-	26
Sub-total	-	1	7	57	117	86	5	4	277	199	-	476
Department of Administration	-	1	-	1	-	1	-	-	3	2	-	5
Office of Internal Audit and Management	-	-	-	2	3	2	1	-	8	6	-	14
Division of Budget and Finance	-	-	1	4	5	6	5	-	21	45	-	66
Division of General Services	-	-	1	2	3	1	2	1	10	71	28	109
Division of External Relations	-	-	2	3	2	1	-	-	8	13	-	21
Division of Public Information	-	-	1	1	1	1	1	-	5	8	-	13
Legal Division	-	-	1	3	2	1	1	-	8	4	-	12
Division of Personnel	-	-	1	2	3	4	2	-	12	26	-	38
Sub-total	-	1	7	18	19	17	12	1	75	175	28	278
Shared Support Services	-	-	-	-	1	-	-	-	1	5	-	6
Contract Administration Services	-	-	-	1	-	1	3	-	5	8	-	13
Conference Services	-	-	-	1	4	3	-	-	8	1	-	9
Interpretation	-	-	-	6	14	27	-	-	48	42	2	92
Translation and Records Services	-	-	1	-	2	-	-	-	3	15	3	21
Medical Services	-	-	-	1	-	2	2	-	5	10	-	15
Library	-	-	-	3	8	11	6	3	31	37	-	68
Data Processing Services	-	-	1	2	-	5	9	-	17	100	18	135
Printing and Publishing Services	-	-	-	1	-	2	-	-	3	5	-	8
Radiation Protection Services	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total	-	-	3	15	29	51	20	3	121	223	23	367
TOTAL	1	5	30	169	256	207	59	13	740	898	76	1 714

a_/ b_/ c_/ d_/ e_/ f_/ g_/ and h_/ see footnotes on Table 58.

Proposed transfer of posts in 1988

Table 63

	DG	DDG	D	P-5	P-4	P-3	P-2	P-1	Sub-Total	GS	M&O	Total
Office of the Director General	-	-	-	(1)	-	-	-	-	(1)	-	-	(1)
Secretariat of the Policy-making Organs	-	-	-	-	-	-	-	-	-	1	-	1
Sub-total	-	-	-	(1)	-	-	-	-	(1)	1	-	-
Department of Technical Co-operation a/												
Division of Technical Assistance and Co-operation	-	-	-	-	-	-	-	-	-	1	-	1
Sub-total	-	-	-	-	-	-	-	-	-	1	-	1
Department of Research and Isotopes												
International Laboratory of Marine Radioactivity	-	-	-	1	(1)	-	-	-	-	-	-	-
International Centre for Theoretical Physics	-	-	-	(1)	1	-	-	-	-	-	-	-
Sub-total	-	-	-	-	-	-	-	-	-	-	-	-
Department of Safeguards												
Division of Operations A	-	-	-	(1)	-	(3)	-	-	(4)	(2)	-	(6)
Division of Operations B	-	-	-	-	1	1	-	-	2	1	-	3
Division of Operations C	-	-	-	-	-	2	-	-	2	-	-	2
Division of Information Treatment f/	-	-	-	-	-	-	-	-	-	1	-	1
Division of Evaluation g/	-	-	-	1	(1)	-	-	-	-	-	-	-
Sub-total	-	-	-	-	-	-	-	-	-	-	-	-
Department of Administration												
Office of Internal Audit and Management	-	-	-	1	-	-	-	-	1	-	-	1
Division of Public Information	-	-	-	-	-	-	-	-	-	(1)	-	(1)
Sub-total	-	-	-	1	-	-	-	-	1	(1)	-	-
Shared Support Services												
Printing and Publishing Services	-	-	-	-	-	-	-	-	-	(1)	-	(1)
Sub-total	-	-	-	-	-	-	-	-	-	(1)	-	(1)
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-

a/ f/ and g/ see footnotes on Table 58.

TRANSFER OF POSTS IN 1988

Table 63 shows the transfer of posts and functions within the Secretariat which the Director General has approved in order to make best use of human resources and available manning table posts. The explanations are given below:

- The P-5 post of Programme Evaluator/Analyst which was recently established and filled is transferred from the Office of the Director General to the Office of Internal Audit and Evaluation Support.
- One GS post is transferred from the Division of Public Information to the Secretariat of the Policy-making Organs.
- One GS post from Printing and Publishing Services is transferred to the Division of Technical Assistance and Co-operation to accommodate the creation of a post for a procurement clerk.
- In order to accommodate the reclassification of a P-4 post in the Monaco Laboratory, this post is exchanged for a P-5 post from the Trieste Centre.
- Several transfers of posts are made within the Department of Safeguards, mainly among the three Divisions of Operations.

APPROPRIATION SECTION 1

TECHNICAL ASSISTANCE AND CO-OPERATION

APPROPRIATION SECTION 1: TECHNICAL ASSISTANCE AND CO-OPERATION

Summary of cost

Table 64

Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	2 291 533	2 844 000	20 000	0.7	2 864 000	-	-	2 864 000	2.5	2 936 000	5.0	3 082 000
Temporary assistance - P	171 496	111 800	(49 800)	(44.5)	62 000	-	-	62 000	1.5	62 900	4.0	65 400
Salaries - established posts - GS & M&O	1 517 118	1 682 000	25 000	1.5	1 707 000	41 000	2.4	1 748 000	10.5	1 886 000	4.0	2 009 000
Temporary assistance - GS & M&O	188 442	117 100	(17 100)	(14.6)	100 000	(41 000)	(41.0)	59 000	9.0	109 000	3.0	66 200
Common staff costs	1 353 642	1 560 800	24 200	1.6	1 585 000	-	-	1 585 000	7.1	1 697 900	4.9	1 775 600
Overtime	5 661	13 900	(8 900)	(64.0)	5 000	-	-	5 000	9.0	5 500	3.0	5 600
Sub-total: Staff costs	5 527 892	6 329 600	(6 600)	(0.1)	6 323 000	-	-	6 323 000	5.9	6 697 300	4.6	7 003 800
Travel	131 359	171 600	(11 600)	(6.8)	160 000	-	-	160 000	1.0	161 600	1.0	163 200
Representation and hospitality	2 043	2 900	100	3.4	3 000	-	-	3 000	2.0	3 100	2.0	3 100
Training	469	-	-	-	-	-	-	-	1.0	-	4.0	-
Experts	19 722	44 000	(9 000)	(20.5)	35 000	-	-	35 000	1.0	35 400	1.0	35 700
Equipment: leased or rented	3 110	-	-	-	-	-	-	-	1.0	-	1.0	-
Equipment: purchased (construction)	66 258	-	-	-	-	-	-	-	1.0	-	1.0	-
Supplies and materials	3 290	11 000	(1 000)	(9.1)	10 000	-	-	10 000	1.0	10 100	1.0	10 200
General operating expenses	61 186	66 900	3 100	4.6	70 000	-	-	70 000	3.5	72 500	3.5	75 000
Miscellaneous	1 328	-	-	-	-	-	-	-	2.0	-	2.0	-
Sub-total: Other direct costs	288 765	296 400	(18 400)	(6.2)	278 000	-	-	278 000	1.7	282 700	1.6	287 200
Translation and records services	461 494	495 000	20 000	4.0	515 000	-	-	515 000	4.2	537 000	4.9	563 000
Printing and publishing services	29 186	34 000	(2 000)	(5.9)	32 000	-	-	32 000	7.3	34 000	4.1	36 000
Data processing services	764 100	767 000	112 000	14.6	879 000	71 000	8.1	950 000	4.6	920 000	3.7	1 032 000
Sub-total: Shared costs	1 254 780	1 296 000	130 000	10.0	1 426 000	71 000	5.0	1 497 000	4.6	1 491 000	4.2	1 631 000
T O T A L	7 071 437	7 922 000	105 000	1.3	8 027 000	71 000	0.9	8 098 000	5.5	8 471 000	4.4	8 922 000

APPROPRIATION SECTION 1: TECHNICAL ASSISTANCE AND CO-OPERATION

Summary of manpower

Table 65

	1988 Adjusted				1989			
	P	GS	M&O	Total	P	GS	M&O	Total
Technical Assistance and Co-operation	46	68	-	114	46	70	-	116

APPROPRIATION SECTION 2

NUCLEAR ENERGY AND SAFETY

APPROPRIATION SECTION 2: NUCLEAR ENERGY AND SAFETY

Summary of cost

Table 66

Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	5 432 688	7 051 000	(255 000)	(3.6)	6 796 000	58 000	0.9	6 854 000	2.5	6 966 000	5.0	7 377 000
Temporary assistance - P	340 856	615 200	(76 200)	(12.4)	539 000	(203 000)	(37.7)	336 000	1.5	547 000	4.0	354 700
Salaries - established posts - GS & M&O	1 987 435	2 206 000	(65 000)	(2.9)	2 141 000	-	-	2 141 000	10.5	2 366 000	4.0	2 460 000
Temporary assistance - GS & M&O	184 030	269 900	(126 900)	(47.0)	143 000	(11 000)	(7.7)	132 000	9.0	155 900	3.0	148 200
Common staff costs	2 585 234	3 327 600	(105 200)	(3.2)	3 222 400	(52 400)	(1.6)	3 170 000	5.9	3 413 000	4.7	3 515 900
Overtime	20 676	26 900	(2 100)	(7.8)	24 800	-	-	24 800	9.3	27 100	2.6	27 800
Sub-total: Staff costs	10 550 919	13 496 600	(630 400)	(4.7)	12 866 200	(208 400)	(1.6)	12 657 800	4.7	13 475 000	4.8	13 883 600
Travel	2 586 932	3 363 700	754 500	22.4	4 118 200	255 000	6.2	4 373 200	1.0	4 159 500	1.0	4 461 000
Representation and hospitality	45 487	56 800	(10 800)	(19.0)	46 000	4 000	8.7	50 000	1.7	46 800	2.1	51 900
Training	5 160	8 400	(4 400)	(52.4)	4 000	-	-	4 000	-	4 000	5.0	4 200
Experts	18 668	507 600	(505 200)	(99.5)	2 400	1 600	66.7	4 000	-	2 400	2.5	4 100
Equipment: leased or rented	48 101	102 800	(10 600)	(10.3)	92 200	5 000	5.4	97 200	2.0	94 000	2.9	102 000
Equipment: purchased (construction)	254 105	111 300	51 200	46.0	162 500	18 000	11.1	180 500	0.9	164 000	1.0	184 000
Supplies and materials	93 462	90 200	92 900	103.0	183 100	22 000	12.0	205 100	1.0	184 900	1.0	209 200
General operating expenses	206 882	351 600	(3 400)	(1.0)	348 200	1 000	0.3	349 200	3.5	360 400	3.5	374 000
Contracts	177 733	168 000	120 000	71.4	288 000	7 000	2.4	295 000	1.0	291 000	1.0	301 000
Research and technical contracts	401 569	681 000	(51 000)	(7.5)	630 000	8 000	1.3	638 000	2.7	647 000	2.4	671 000
Miscellaneous	108 288	53 000	33 200	62.6	86 200	38 800	45.0	125 000	2.1	88 000	1.9	130 000
Sub-total: Other direct costs	3 946 387	5 494 400	466 400	8.5	5 960 800	360 400	6.0	6 321 200	1.4	6 042 000	1.3	6 492 400
Conference services	243 034	295 000	(13 000)	(4.4)	282 000	(25 000)	(8.9)	257 000	7.1	302 000	3.9	286 000
Interpretation services	408 437	379 000	(42 000)	(11.1)	337 000	(24 000)	(7.1)	313 000	2.1	344 000	4.8	335 000
Translation and records services	692 673	761 000	(27 000)	(3.5)	734 000	9 000	1.2	743 000	4.6	768 000	4.5	812 000
Printing and publishing services	3 328 038	3 796 000	(569 000)	(15.0)	3 227 000	(66 000)	(2.0)	3 161 000	7.3	3 464 000	4.1	3 531 000
Data processing services	1 566 300	1 792 000	(267 000)	(14.9)	1 525 000	18 000	1.2	1 543 000	4.7	1 596 000	3.6	1 673 000
Contract administration	88 528	104 000	(4 000)	(3.8)	100 000	-	-	100 000	7.0	107 000	3.7	111 000
Radiation protection services, Library	1 857 532	1 530 000	-	-	1 530 000	-	-	1 530 000	5.7	1 617 000	4.4	1 689 000
Sub-total: Shared costs	8 184 542	8 657 000	(922 000)	(10.7)	7 735 000	(88 000)	(1.1)	7 647 000	6.0	8 198 000	4.1	8 437 000
T O T A L	22 681 848	27 648 000	(1 086 000)	(3.9)	26 562 000	64 000	0.2	26 626 000	4.3	27 715 000	3.8	28 813 000

APPROPRIATION SECTION 2: NUCLEAR ENERGY AND SAFETY

Expenditure by Division

Table 67

Division	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Nuclear Power	3 850 403	5 073 000	15 000	0.3	5 088 000	(8 000)	(0.2)	5 080 000	3.7	5 275 000	3.6	5 459 000
Nuclear Fuel Cycle	3 870 478	5 008 000	(53 000)	(1.1)	4 955 000	(137 000)	(2.8)	4 818 000	3.7	5 137 000	3.5	5 173 000
Nuclear Safety	8 409 766	10 214 000	(1 021 000)	(10.0)	9 193 000	209 000	2.3	9 402 000	4.0	9 563 000	3.7	10 135 000
Scientific and Technical Information a/	6 551 201	7 353 000	(27 000)	(0.4)	7 326 000	-	-	7 326 000	5.7	7 740 000	3.9	8 046 000
Total Appropriation Section	22 681 848	27 648 000	(1 086 000)	(3.9)	26 562 000	64 000	0.2	26 626 000	4.3	27 715 000	3.8	28 813 000

a/ These figures do not include the cost of the Computer Section which can be found in Table 135, Shared Support Services.

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Manpower by Division

Table 68

Division	1988 Adjusted				1989			
	P	GS	M&O	Total	P	GS	M&O	Total
Nuclear Power	23	13	-	36	23	13	-	36
Nuclear Fuel Cycle	21	13	-	34	21	13	-	34
Nuclear Safety	38	26	-	64	38	26	-	64
Scientific and Technical Information	18	33	-	51	18	33	-	51
Total Appropriation Section	100	85	-	185	100	85	-	185

NUCLEAR ENERGY AND SAFETY

D I V I S I O N O F N U C L E A R P O W E R

ACTIONS PLANNED FOR 1989-90

Table 69

Area of Activity A.1 Nuclear Power Planning and Implementation

Task	Action or source	Services needed	Year of completion[1]
PROJECT A.1.01: NUCLEAR POWER PROGRAMME PLANNING			
<u>Area of Concentration A: Studies and reviews</u>			
1. Technical report [2] - Energy, electricity and nuclear power estimates for the period up to 2010 (RDS-1)	TCM 89/1 TCM 90/1 UN, IBRD data EEDB, PRIS	Data processing	Annually
2. Technical report on nuclear power and its fuel cycle: status and trends (jointly with A.2.01 and NENF)	EEDB, PRIS	Data processing	Annually
3. Technical report on costs of generating electricity by nuclear and alternative types of power station (in co-operation with NEA)	AGM 89/4 AGM 90/4	Data processing	1990
4. 2-3 papers for publication		Data processing	Annually
<u>Area of Concentration B: Assistance to Member States</u>			
5. Technical document on experience with using the Agency's models for energy and nuclear power planning in developing countries	AGM 89/2 AGM 90/2	Data processing	1991
6. Technical document on an integrated package approach to planning and decision-making for nuclear power programmes	AGM 89/3 AGM 90/3	Data processing	1990
7. 1-2 technical documents annually on energy and nuclear power planning studies for individual countries	TC	Data processing	Annually
8. 1-2 training courses on energy planning (MAED) and on electric system expansion planning (WASP)	TC		Annually
9. 2-3 regional workshops for WASP and MAED users	TC/RB		Annually
10. Fourteen advisory missions annually, including 1-2 nuclear power planning advisory team missions (in co-operation with IBRD)	TC/RB		Annually
11. 1-2 national seminars for decision-makers annually			Annually
12. Support for about 6 TC projects, including one interregional project	TC		
PROJECT A.1.07: SUPPORT FOR NUCLEAR POWER PROJECT IMPLEMENTATION			
<u>Area of Concentration A: Feasibility studies and infrastructure development planning</u>			
13. Interregional training course	TC		1989 or 1990
14. Support for 1-2 TC projects on feasibility studies	TC		
15. Support for 1-2 TC projects on industrial infrastructure	TC		
<u>Area of Concentration B: Manpower development</u>			
16. Support for 3-5 TC projects on comprehensive manpower development	TC, UNDP		
<u>Area of Concentration C: Project management strengthening</u>			
17. Interregional training course	TC		1989 or 1990

[1] For publications, the date given is that by which the manuscript is due to be completed.

[2] Throughout these tables, the terms "Technical report" and "Safety" are used to denote priced publications, while the term "Technical document" indicates an unpriced publication.

Table 69 (Cont.)	Task	Action or source	Services needed	Year of completion
18.	Support for 5-7 projects on specific aspects of project management tasks (e.g., bid invitation and evaluation, contract negotiation)	TC		
PROJECT A.1.08: FINANCIAL PLANNING FOR NUCLEAR POWER PROJECTS				
19.	Seminar on costs and financing of nuclear power programmes in developing countries (1990)			Summary report, 1990
20.	Technical report reviewing existing and proposed contractual and financing arrangements for nuclear power plants	AGM 89/5 AGM 90/6	Data processing	1990
21.	2-3 papers for publication		Data processing	Annually
22.	Technical document on the use of the Agency's models for financial analysis of nuclear power programmes/projects	AGM 90/5	Data processing	1991
23.	Support for 2-3 TC projects	TC, IBRD		

Table 70

Area of Activity A.2 Nuclear Power Plant Performance

	Task	Action or source	Services needed	Year of completion
PROJECT A.2.01: NUCLEAR POWER PLANT PERFORMANCE ANALYSIS				
1.	Technical report on operating experience with nuclear power reactors in Member States	Annual questionnaire	Data processing	Annually
2.	Technical report on performance analysis of operating experience (RDS-4)	AGM 89/6 AGM 90/7	Data processing	Annually
3.	Technical report - Power reactors in the world (RDS-2)	Annual questionnaire	Data processing	Annually
4.	Technical document on procedures and practices for performance improvements in nuclear power plants	AGM 89/7 AGM 90/8		1991
5.	Technical report on costs/benefits of nuclear power plant performance improvements	AGM 89/8 AGM 90/9	Data processing	1991
6.	Provision of about 70 special data sets from PRIS, on request	PRIS	Data processing	Annually
7.	Technical report on nuclear power and its fuel cycle: status and trends (jointly with A.1.01 and NENF)	PRIS EEDB	Data processing	Annually
8.	Advisory missions (about 5 annually)	TC		Annually
9.	4-5 papers for publication		Data processing	Annually
PROJECT A.2.02: NUCLEAR POWER PLANT AGEING AND LIFE EXTENSION				
10.	Two technical documents annually on specific aspects of plant ageing (subjects to be decided after IWG in 1988 and 1990)	SPMs 89/9 IWG 90/10 SPMs 90/11		1989-90
11.	Updating of technical report on neutron irradiation embrittlement of reactor pressure vessel steels			1989
12.	Technical document on optimizing reactor pressure vessel surveillance programmes and their analysis	CRP 86-90		1990
13.	Technical document on cost/benefit analysis of lifetime extension	AGM 90/12		1990

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Table 70 (Cont.)	Task	Action or source	Services needed	Year of completion
PROJECT A.2.03: QUALITY PROGRAMME MANAGEMENT				
<u>Area of Concentration A: Development of guidelines and manuals</u>				
	14. Manual on QA in operations management	AGM 88		1989
	15. Internal report on the effectiveness of the Agency's QA programmes and manual on measuring the effectiveness of quality programmes	AGM 89/10 AGM 90/13		1991
	16. Manual on the grading of QA requirements	AGM 89/11		1990
	17. Manual on non-conformance and corrective actions	AGM 89/12		1990
	18. Technical document on an integrated package approach for the establishment of QA training programmes and capabilities	AGM 90/14		1991
<u>Area of Concentration B: Exchange of information and assistance to Member States</u>				
	19. Co-operation in symposium on quality in nuclear power plant operation (organized by Canadian Government) (1989)			1989
	20. Regional seminar on management of quality for nuclear power projects			Summary report, 1990
	21. Interregional training course on QA	TC		1989 or 1990
	22. Support for 10-15 TC projects, including national training courses	TC		
PROJECT A.2.06: QUALIFICATION STANDARDS FOR NUCLEAR POWER PLANT OPERATING PERSONNEL				
<u>Area of Concentration A: Development of guidance for qualification standards</u>				
	23. Technical report - Revision of guidebook on training and qualification of nuclear power plant operations personnel	AGM 88		1989
	24. Technical document on procedures for the authorization and licensing of operators and accreditation of training programmes	Questionnaire AGM 90/15		1991
	25. Technical document on the use of simulators for training and for maintaining competence	AGM 89/13 AGM 90/16		1990
<u>Area of Concentration B: Assistance to Member States</u>				
	26. Interregional training course on nuclear power plant operations personnel training and qualification (in co-operation with NENS)	TC		1990
	27. Support for 3-5 TC projects, including national training courses	TC		
PROJECT A.2.07: MAN-MACHINE INTERFACE STUDIES				
	28. Technical report - Guidelines for control room design (in co-operation with NENS)	AGM 90/17		1991
	29. Two technical documents annually on man-machine interface issues	IWG 89/14 SPMs 89/15 SPMs 90/18		Annually
	30. Technical document on the balance between automation and human actions in nuclear power plant operation (in co-operation with NENS)	AGM 89/16 AGM 90/19		1991
	31. Support for 3-5 TC projects	TC		

Table 71

Following the splitting of Project I.3.02 into two projects (A.2.02 and I.3.02), Table 71 of the draft version of the programme and budget document has been incorporated into Table 70. For easy reference, the original numbering of subsequent tables has been retained.

Table 72

Area of Activity A.3 Nuclear Power Systems Technologies

Task	Action or source	Services needed	Year of completion
PROJECT A.3.01: IMPROVEMENT OF REACTOR TECHNOLOGIES			
1. IWG report - Annual review of LMFBR national development programmes	IWG 89/17 IWG 90/20		Annually
2. Four IWG reports on sodium-cooled reactor technology	SPMs 89/18 SPMs 90/21		1989/90
3. Development and intercomparison of core mechanics codes for LMFBRs	CRP 86-89		1989
4. Development of methods for sodium boiling noise detection	CRP 86-90		1990
5. Technical document on the status of high converter technology	TCM 89/19		1990
6. Support for 1-3 TC projects	TC		
PROJECT A.3.02: EVOLUTION OF CURRENT POWER REACTOR TECHNOLOGY			
<u>Area of Concentration A: Reactor technology</u>			
7. IWG report - Biannual review of advanced technology for water reactors	IWG 90/22		1990
8. Two technical documents on improvement of water reactor designs	TCM 89/20 TCM 90/23		1989/90
9. Two technical documents on water-cooled reactor technology	TCM 89/21 SPM 90/24		1989/90
10. Technical document on the impact of advanced technologies on reactor systems	TCM 89/22		1989
11. Technical document on thermal hydraulic analysis	TCM 90/26		1990
12. Technical document on coolant disturbances in reactor cores	SPM 90/27		1990
<u>Area of Concentration B: Core management</u>			
13. Development of core design data base	CRP 89-92	Data processing	1992
14. Technical document on maintenance of reactor core data files	TCM 90/25	Data processing	1990
15. Technical document on core design parameters	SPM 89/23		1989
16. Technical document on in-core fuel management	SPM 89/24		1989
17. Development of in-core fuel management codes	CRP 89-92		1992
18. Support for 2-3 TC projects	TC		

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Table 72 (Cont.)	Task	Action or source	Services needed	Year of completion
PROJECT A.3.03: NUCLEAR HEAT APPLICATIONS				
19.	IWG Report - Biannual review of HTGCR national development programmes	IWG 89/25		1989
20.	Four IWG reports on HTGCR technology	SPMs 89/26 SPMs 90/28		1989/90
21.	Development and intercomparison of codes for GCR components	CRP 88-91		1991
22.	Support for 1-2 TC projects	TC		
PROJECT A.3.05: FUSION RESEARCH AND ENGINEERING				
23.	Technical document on fusion engineering and safety	TCM 89/27		1989
24.	Technical document on technology requirements for steady-state tokamaks	SPM 89/28		1989
25.	Technical document on materials for next-step tokamaks	TCM 90/29		1990
26.	Technical document on high temperature supraconducting materials	SPM 90/30		1990
27.	Development of lifetime prediction methods for plasma-facing components	CRP 1988-91		1991

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1989-90

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1989-90, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

<u>1989</u>	<u>Table</u>
1. Technical Committee on energy, electricity and nuclear power planning: UN and other international organization approaches	69, No. 1
2. Advisory Group on experience with using the Agency's models (MAED, WASP, etc.) for energy and nuclear power planning in developing countries	69, No. 5
3. Advisory Group on integrated package approach to planning and decision-making for nuclear power programmes	69, No. 6
4. Advisory Group on costs of generating electricity by nuclear and alternative types of power stations	69, No. 3

<u>1989</u>	<u>Table</u>
5. Advisory Group to review contracting and financing schemes for nuclear power plants	69, No. 20
6. Advisory Group on performance analysis of operating experience of nuclear power plants	70, No. 2
7. Advisory Group on procedures and practices for performance improvements of nuclear power plants	70, No. 4
8. Advisory Group on costs/benefits of nuclear power plant performance improvements	70, No. 5
9. Two Specialists' Meetings on specific aspects of plant ageing (exact subjects to be defined after IWG in 1988)	70, No. 10
10. Advisory Group on measuring the effectiveness of quality programmes	70, No. 15
11. Advisory Group on grading of QA activities	70, No. 16
12. Advisory Group on non-conformance and corrective actions	70, No. 17
13. Advisory Group on the use of simulators for training and for maintaining competence	70, No. 25
14. Technical Committee (IWG) on nuclear power plant control and instrumentation	70, No. 29
15. Two Specialists' Meetings on man-machine interface issues	70, No. 29
16. Advisory Group on the balance between automation and human actions in nuclear power plant operation	70, No. 30
17. Technical Committee (IWG) on fast breeder reactor development	72, No. 1
18. Two Specialists' Meetings on fast breeder reactor technology	72, No. 2
19. Technical Committee on the status of high converters	72, No. 5
20. Technical Committee on the review of passive safety and water reactor designs	72, No. 8
21. Technical Committee on water-cooled reactor technology	72, No. 9
22. Technical Committee on the impact of advanced technologies on reactor systems	72, No. 10
23. Specialists' Meeting on core design parameters	72, No. 15
24. Specialists' Meeting on in-core fuel management	72, No. 16
25. Technical Committee (IWG) on high temperature gas-cooled reactor development	72, No. 19

<u>1989</u>	<u>Table</u>
26. Two Specialists' Meetings on HTGCR technology	72, No. 20
27. Technical Committee on fusion reactor engineering and safety	72, No. 23
28. Specialists' Meeting on fusion reactor technology requirements for steady state tokamaks	72, No. 24
<u>1990</u>	<u>Table</u>
1. Technical Committee on energy, electricity and nuclear power planning: UN and other international organization approaches	69, No. 1
2. Advisory Group on experience with using the Agency's models (MAED, WASP, etc.) for energy and nuclear power planning in developing countries	69, No. 5
3. Advisory Group on integrated package approach to planning and decision-making for nuclear power programmes	69, No. 6
4. Advisory Group on costs of generating electricity by nuclear and alternative types of power stations	69, No. 3
5. Advisory Group on using the Agency's models for financial analysis of nuclear power programmes/projects	69, No. 22
6. Advisory Group to review contracting and financing schemes for nuclear power plants	69, No. 20
7. Advisory Group on performance analysis of operating experience of nuclear power plants	70, No. 2
8. Advisory Group on procedures and practices for performance improvements of nuclear power plants	70, No. 4
9. Advisory Group on costs/benefits of nuclear power plant performance improvements	70, No. 5
10. Technical Committee (IWG) on reliability of reactor pressure components	70, No. 10
11. Two Specialists' Meetings on specific aspects of plant ageing (exact subjects to be decided after IWG in 1990)	70, No. 10
12. Advisory Group on cost/benefit analysis of nuclear power plant lifetime extension	70, No. 13
13. Advisory Group on measuring the effectiveness of quality programmes	70, No. 15

<u>1990</u>	<u>Table</u>
14. Advisory Group on development of integrated package approach for the establishment of QA training programmes and capabilities	70, No. 18
15. Advisory Group on procedures for authorization and licensing of operators and accreditation of training programmes	70, No. 24
16. Advisory Group on the use of simulators for training and for maintaining competence	70, No. 25
17. Advisory Group on guidelines for control room design	70, No. 28
18. Two Specialists' Meetings on man-machine interface issues (exact subjects to be decided after IWG in 1989)	70, No. 29
19. Advisory Group on the balance between automation and human actions in nuclear power plant operation	70, No. 30
20. Technical Committee (IWG) on fast breeder reactor development	72, No. 1
21. Two Specialists' Meetings on fast breeder reactor technology	72, No. 2
22. Technical Committee (IWG) on advanced technologies for water-cooled reactors	72, No. 7
23. Technical Committee on impact of accident situations on future water-cooled reactor designs	72, No. 8
24. Specialists' Meeting on water-cooled reactor technology	72, No. 9
25. Technical Committee on maintenance of reactor core data files	72, No. 14
26. Technical Committee on thermal hydraulic analysis	72, No. 11
27. Specialists' Meeting on coolant disturbances in reactor cores	72, No. 12
28. Two Specialists' Meetings on HTGCR technology	72, No. 20
29. Technical Committee on materials for next-step tokamaks	72, No. 25
30. Specialists' Meeting on high-temperature supraconducting materials	72, No. 26

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D I V I S I O N O F N U C L E A R F U E L C Y C L E

ACTIONS PLANNED FOR 1989-90

Table 73

<u>Area of Activity B.1</u>		<u>Resources of Nuclear Raw Material</u>		
Task	Action or source	Services needed	Year of completion	
PROJECT B.1.01: DATA ON NUCLEAR RAW MATERIAL RESOURCES, SUPPLY AND DEMAND				
1. Biennial technical report- Assessment of uranium resources and supply (jointly with NEA) (Red Book)	Questionnaire TCM 89/1 CS 90		1989	
2. Technical document on long-term uranium supply	CS 88		1989	
PROJECT B.1.02: NUCLEAR RAW MATERIAL GEOLOGY, EXPLORATION AND MINING				
<u>Area of Concentration A: World uranium geology</u>				
3. Technical document on assessment of new exploration areas	CS 89		1990	
4. Technical document - Review of world atlas of uranium deposits	CS 90		1991	
5. Maintaining the INTURGEO data base		Data processing	Continuing	
6. Technical document on uranium provinces of Asia and the Pacific	TCM 89/2		1990	
<u>Area of Concentration B: Exploration and evaluation of uranium deposits</u>				
7. Technical report on the use of uranium deposit models in resource assessment	TCM 89/3		1991	
8. Technical report on classification and recognition criteria for uranium deposits	CS 88, 89		1989	
9. Technical report - Manual on uranium mineralogy	CS 89		1990	
10. Technical report - Guidebook on feasibility studies for, and economic analyses of, mining projects (also serves objectives of B.2.02)	CS 90, 91		1991	
11. Technical report - Manual on uranium exploration, planning and practice	CS 88, 90		1990	
12. Uranium Newsletter	National reports		Annually	
<u>Area of Concentration C: Wider use of uranium data and technology</u>				
13. Technical report on geochemical and radioelement maps of the world (jointly with UNESCO and IUGS)	TCM 90/1		1991	
PROJECT B.1.03: ASSISTANCE IN NUCLEAR RAW MATERIAL RESOURCES ASSESSMENT AND DEVELOPMENT				
14. Technical document on geological data management, data exchange and national mineral inventory systems	CS 89		1990	
15. Technical report - Guidebook on the regulation of uranium development and production (also serves objectives of B.2.02)	CS 90		1991	
16. Training course on uranium exploration and/or development	TC		1990	
17. Support for 25-35 TC projects	TC			

Table 74

Area of Activity B.2 Processing of Nuclear and Reactor Materials

Task	Action or source	Services needed	Year of completion
PROJECT B.2.01: NUCLEAR AND REACTOR MATERIALS PROCESSING AND PRODUCTION			
1. Technical report on uranium extraction technology	CS 89		1990
2. Technical report on nuclear fuel cycle facilities in the world	CS 89	Data processing	1989/90
3. Technical report on uranium refining and conversion and the production of uranium dioxide powders and pellets	TCM 90/2		1991
4. Technical document on effects of new enrichment technologies on uranium and uranium hexafluoride demand	AGM 89/4		1990
5. Technical document on economic analysis of the production of uranium concentrates	CS 89, 90		1991
6. Technical document on safety aspects of production, handling transport and storage of uranium hexafluoride	AGM 89/5		1990
PROJECT B.2.02: GUIDANCE ON NUCLEAR AND REACTOR MATERIALS PROCESSING AND PRODUCTION			
7. Technical report - Guidebook on planning nuclear fuel cycle activities in developing countries	AGM 89/6 CS 90, 91		1992
8. Technical report - Manual on feasibility studies and economic analyses of uranium mining and milling projects	CS 89, 90		1991
9. Interregional training course on uranium ore processing	TC		1989

Table 75

Area of Activity B.3 Reactor Fuel Design, Fabrication and Performance

Task	Action or source	Services needed	Year of completion
PROJECT B.3.01: DESIGN, QUALITY AND PERFORMANCE OF REACTOR FUEL			
<u>Area of Concentration A: Improved materials reliability</u>			
1. Technical document on relation of corrosion behaviour to physico-chemical properties of zirconium alloys in a water reactor environment	TCH 89/7		1990
2. Technical document on qualification of new zirconium alloys for improved corrosion resistance	TCH 90/3 CS 90		1991
3. CRP on fission gas release under power ramping, load follow and accident conditions (1989-91)	CS 89		1991
4. Technical document on technical and safety aspects of fuel design, performance and utilization in advanced water cooled reactors (with high conversion and inherently safe) (in co-operation with NENP)	TCH 91		1991
<u>Area of Concentration B: Improved fuel utilization and plant performance</u>			
5. Technical document on improvements in fuel utilization and recycling of plutonium and uranium	TCH 89/8 CS 89		1990

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Table 75 (Cont.)	Task	Action or source	Services needed	Year of completion
6.	Technical document on fuel performance under extended burnup conditions	TCM 89/9		1990
7.	Technical document on post-irradiation examination techniques and experience, and feedback to fuel fabrication and behaviour	TCM 90/4		1991
8.	Technical document on decontamination and other means to reduce activity and crud buildup or to increase reactor lifetime	TCM 90/5		1991
9.	Technical document on influence of primary circuit materials on core crud build-up	AGM 90/6 CS 91		1991
10.	CRP on water chemistry control and coolant interaction with fuel and primary circuit materials in water cooled power reactors (WACOLIN) (1987-91) (in co-operation with NENP)	CS 89, 90		1992
11.	Technical document on advanced fuel technology and performance: current status and prospects	AGM 89/10		1990
12.	CRP on examination and documentation methodology for water reactor fuel (ED-WARF) (1983-89)			1989
13.	CRP on the use of gadolinium in water reactor fuel (1989-93)	CS 89		1993
14.	Technical report - Guidebook on materials, systems and technology or purification of water reactor coolant (in co-operation with NENP)	CS 90		1992
15.	Technical report on incentives for improvements in the design and utilization of nuclear fuel in LWRs (in co-operation with NENP)	CS 89		1990
<u>Area of Concentration C: Improved fuel fabrication</u>				
16.	Guidebook on destructive tests for reactor fuel: technology, materials, experience and feedback to design and manufacture	CS 89, 90		1991
17.	Technical document - overview of alternative structural materials for LWR assembly fabrication, and primary cooling circuits (in co-operation with NENP)	CS 90 TCM 91		1992
18.	Seminar on quality assurance and quality control in the design and manufacture of water reactor fuel (1990)			Summary report, 1991
19.	Training course on QC and QA of nuclear fuel	TC		1990
<u>General</u>				
20.	IWG on Fuel Performance and Technology	IWG 89/11		Summary report, 1990
21.	Support for 10-15 TC projects	TC		

Table 76

Area of Activity B.4 Spent Fuel Management

Task	Action or source	Services needed	Year of completion
PROJECT B.4.01: SPENT NUCLEAR FUEL ARISING AND CAPACITY REQUIREMENTS			
1. Technical document on spent fuel management: current status and prospects (biennial)	CS 90 AGM 90/7		1991
2. Technical document on spent nuclear fuel arising and capacity requirements (biennial)		Data processing	1990
3. Technical document - Updated multilingual glossary of terms related to spent fuel storage	CS 89, 90		1990

Table 76 (Cont.)	Task	Action or source	Services needed	Year of completion
PROJECT B.4.02: SPENT FUEL STORAGE OPTIONS AND PRACTICES				
<u>Area of Concentration A: Technical and economic aspects of spent fuel storage</u>				
4.	CRP on behaviour of spent fuel assemblies and storage equipment at long-term storage conditions (BEFAST-II) (1987-91)	CS 89, 90		1992
5.	Technical report on the improvement of structural materials resistance to chemical degradation and irradiation in the back end of the fuel cycle	TCM 89/12 CS 89		1990
6.	Technical document on economics of spent fuel storage	AGM 89/13		1990
7.	CRP on the behaviour of structural materials under irradiation with emphasis on heterogeneous processes (1988-92)	CS 89, 90		1993
8.	Technical document on rod consolidation experience	CS 89, 90		1991
9.	Technical document on decontamination of transport casks and of spent fuel storage facilities	TCM 89/14		1990
10.	Technical report on topical problems of spent fuel storage	TCM 90/8		1992
<u>Area of Concentration B: Safety-related aspects of spent fuel storage</u>				
11.	Technical report on the main principles of the handling, conditioning, transportation and storage/disposal of severely damaged nuclear fuel	AGM 88 TCM 88 CS 89, 90		1990
12.	Seminar on spent fuel storage - safety, engineering and environmental aspects (1990)			Summary report, 1991
13.	Safety guide on spent fuel management after nuclear accidents (in co-operation with NENS)	CS 89, 90 AGM 89/15 AGM 90/9		1991
<u>General</u>				
14.	Spent Nuclear Fuel Storage Newsletter	CS 89		Annually
15.	Training course on spent fuel storage	TC		1990
16.	Support for 5-10 TC projects	TC		
PROJECT B.4.03: SPENT FUEL TREATMENT AND RECYCLING				
17.	Technical report on economics of the back end of the nuclear fuel cycle	AGM 88 AGM 90/10		1991
18.	Technical document on status of the treatment of irradiated nuclear fuel	CS 89	Data processing	1990
19.	Technical document on remote fuel fabrication technology using recycled fissile materials (including safety aspects)	CS 89 TCM 90/11		1990
20.	Technical report on the feasibility of the separation of non-fissile materials from high-level waste	CS 89		1990
21.	Technical document on plutonium arisings and recovery and status of MOX fuel utilization (biennial)		Data processing	1990
22.	Technical document on topical problems of spent fuel treatment	TCM 89/16		1991

Table 77

Area of Activity C.1 Handling, Treatment, Conditioning and Storage of Radioactive Waste

Task	Action or source	Services needed	Year of completion
PROJECT C.1.01: PROCESSING AND STORAGE OF HIGH-LEVEL AND ALPHA-BEARING WASTE			
1. CRP on the performance of solidified high-level waste forms and engineered barriers under repository conditions (1984-89)			1989
2. Technical report on design and operation of high-level waste vitrification and storage facilities	CS 88, 89 AGM 89/17		1990
3. Technical report on concepts for the conditioning of spent fuel for final waste disposal	CS 89 TCM 90/12		1991
4. Technical report on quality assurance and quality control concepts for production of solidified high-level waste forms and packages	CS 90		1992
PROJECT C.1.02: PROCESSING AND STORAGE OF WASTE FROM NUCLEAR POWER PLANTS AND NUCLEAR FUEL CYCLE FACILITIES			
<u>Area of Concentration A: Status review of technical aspects of wastes generated under normal conditions</u>			
5. Technical report on retention, conditioning and disposal of carbon-14	CS 90		1992
6. Technical report on volume reduction technologies for low- and intermediate-level solid wastes	CS 89 TCM 90/13		1990
<u>Area of Concentration B: Aspects of wastes generated under normal conditions requiring further R & D</u>			
7. Technical report on evaluation of bituminization techniques for solidification of radioactive concentrates	CS 88, 89 TCM 89/18		1990
8. CRP on evaluation of low- and intermediate-level radioactive solid waste forms and packages (1985-90)			1990
9. CRP on use of inorganic sorbents for liquid waste treatment and backfill for underground repositories (1986-92)			1992
<u>Area of Concentration C: Wastes generated under abnormal conditions</u>			
10. Safety guide on management of radioactive waste generated during unplanned or accident situations at nuclear power plants	CS 90 AGM 90/14		1991
11. Technical report on handling and retention of airborne radionuclides at nuclear power plants during abnormal operations	CS 89 AGM 89/19		1990
PROJECT C.1.03: PROCESSING AND STORAGE OF WASTE FROM NUCLEAR APPLICATIONS			
<u>Area of Concentration A: Review of and R & D on specific aspects</u>			
12. Technical report on packaging of low- and intermediate-level radioactive waste	CS 89, 90 AGM 90/15		1991
13. Technical report on the chemical treatment of low- and intermediate-level liquid radioactive wastes	CS 89, 90 TCM 89/20		1990
14. CRP on treatment technologies for special low- and intermediate-level wastes generated from institutional sources (1990-94)			1994
<u>Area of Concentration B: Assistance with the development of national waste management programmes</u>			
15. Technical document on management of low- and intermediate-level radioactive wastes generated in small nuclear research centres and by radioisotope users in medicine, research and industry	CS 88, 89		1990

Table 77 (Cont.)	Task	Action or source	Services needed	Year of completion
16.	Technical document on reference design waste processing and storage facilities for low- and intermediate-level wastes in developing Member States	CS 89, 90 Contract		1990
17.	Training course on safe use, control and disposal of radiation sources (in co-operation with NENS)	TC		1989
18.	Support for WAMAP and 15-20 TC projects	TC		

Table 78

Area of Activity C.2 Radioactive Waste Disposal

Task	Action or source	Services needed	Year of completion
PROJECT C.2.01: RESEARCH AND TECHNICAL ASPECTS OF WASTE DISPOSAL			
<u>Area of Concentration A: Waste disposal technology and engineering development</u>			
1.	Safety guide on siting, design and construction of geological repositories for high-level and alpha-bearing radioactive waste	AGM 89/21 CS 89	1990
2.	Safety guide on operation, shutdown and closing of deep geological repositories	CS 89, 90 AGM 90/16	1991
3.	CRP on the geochemistry of long-lived transuranic actinides and fission products (1986-91)		1991
4.	CRP on migration and biological transfer of radionuclides from shallow land burial of radioactive wastes (1984-89)		1989
5.	Technical report on the disposal of chemically hazardous radioactive waste	CS 89	1990
6.	Technical report - State-of-the-art review of the underground disposal of radioactive wastes	AGM 89/22 CS 89, 90	1990
7.	Waste Management Research Abstracts (jointly with NESI)		Data processing Annually
8.	Advice on the Agency's waste disposal programme and review of documents	WAMAC 89/23 WAMAC 90/17	1989/90
9.	Support for 2-5 TC projects, including WAMAP missions	TC	
<u>Area of Concentration B: Post-accident entombment technology</u>			
10.	Technical report on near-field effects of the post-accident entombment of damaged nuclear facilities	CS 89	1990
11.	Safety manual on safety and performance assessment for the radioactive waste isolation system at entombed nuclear facilities	AGM 89/24 CS 89	1990
12.	Technical report on evaluation and optimization of post-accident sealing technology for nuclear facilities	CS 89, 90 AGM 89/25	1991
PROJECT C.2.02: REGULATORY ASPECTS OF WASTE DISPOSAL			
13.	Safety standards for underground disposal of radioactive waste, and guides to the standards	CS 90 AGM 90/18	1992
14.	Safety guide to the standards for underground disposal of radioactive waste in shallow ground and rock cavities	CS 90	1993

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Table 78 (Cont.)	Task	Action or source	Services needed	Year of completion
15.	Safety guide to the standards for underground disposal of radioactive waste in deep geological formations	CS 90		1993
16.	Safety standards for performance and safety assessment for radioactive waste repositories, including guides to the standards for near-surface and deep geological disposal	CS 90		1993
17.	Safety standards - review of the Agency's Definition and Recommendations on radioactive matters for the purposes of the London Dumping Convention	CS 90		1992
<hr/>				
PROJECT C.2.03: EXEMPTION OF RADIATION SOURCES FROM REGULATORY CONTROL				
<hr/>				
18.	Safety guide on principles for exemption of radiation sources and practices from regulatory control (jointly with NENS)	CS 89		1989
19.	Safety manual on practical application of exemption principles to radioactive waste disposal in the terrestrial environment (jointly with NENS)	CS 89, 90 AGM 89/26 AGM 90/19		1991
20.	Safety manual on application of exemption principles to radioactive waste disposal in the marine environment	CS 89, 90 AGM 90/20		1990
<hr/>				
PROJECT C.2.07: RADIOLOGICAL AND ENVIRONMENTAL EFFECTS OF WASTE DISPOSAL				
<hr/>				
<u>Area of Concentration A: Environmental impact assessment</u>				
21.	Symposium on safety assessment of radioactive waste repositories (1989)			Proceedings, 1989
22.	Safety manual on development of a practical methodology for individual and collective dose assessment (jointly with NENS)	CS 89		1989
23.	Handbook of transfer factors for terrestrial and freshwater environments	CS 89		1989
24.	CRP on validation of models for the transfer of radionuclides in terrestrial, urban and aquatic environments (1988-92) (jointly with NENS)			Technical document, 1992
25.	Technical report on assessment of impact on man of mixed wastes from the nuclear fuel cycle	CS 89, 90 AGM 89/27		1991
26.	Technical report on practical procedures for assessing the radiological impact of wastes from radioisotope use in medicine, research and industry	CS 89, 90 AGM 90/21		1991
27.	Technical report on environmental impact assessment: techniques and uses in relation to the nuclear fuel cycle	CS 89, 90 AGM 89/28		1991
28.	Technical report on the assessment and control of radionuclide discharges to rivers and coastal waters (jointly with NENS)	CS 89, 90 AGM 90/22		1992
29.	Technical document on waste repository assessment services (in support of WAMAP)	CS 89, 90	Data processing	1991
<u>Area of Concentration B: Comparative studies</u>				
30.	Technical report on the risks from sea dumping of radioactive wastes compared with other risks, including those from non-radioactive waste disposal	CS 89 AGM 89/29		1990
31.	Technical report reviewing comparisons between land and sea radioactive waste disposal options	CS 89		1990

Table 79Area of Activity C.3 Decontamination and Decommissioning of Nuclear Installations

Task	Action or source	Services needed	Year of completion
PROJECT C.3.01: GUIDANCE ON THE DECONTAMINATION AND DECOMMISSIONING OF NUCLEAR INSTALLATIONS			
1. Technical report on monitoring for compliance with criteria related to waste management, decommissioning termination survey or unrestricted use criteria	CS 89, 90 TCM 89/30		1992
2. Technical report on project planning and management for decommissioning small and large nuclear facilities	CS 90		1992
3. Technical report on the use of remotely operated equipment in the decommissioning, rehabilitation, isolation or disposal of nuclear facilities after normal operation or a serious accident	TCM 89/31 CS 90		1990
4. Technical report on development of decontamination technology	CS 90		1991
5. CRP on decontamination technology (1989-92)			1992
PROJECT C.3.02: DECOMMISSIONING OF URANIUM MINING AND MILLING FACILITIES			
6. Technical report on the design of impoundment and disposal facilities for mining and milling tailings, conditioning of tailings for disposal, and the methodology and technology used in the rehabilitation and stabilization of tailings piles	CS 89 AGM 90/23		1991
7. Technical report reviewing factors relevant to the decommissioning of mining and milling facilities, mines and sites and the management of wastes from such operations	CS 90		1992
8. Support for 2-3 TC projects	TC		
PROJECT C.3.03: CLEAN-UP OF LARGE AREAS AFTER A NUCLEAR ACCIDENT			
9. Technical report on the safe transport, disposal and stabilization of very large volumes of contaminated material from the clean-up of large areas after a nuclear accident (jointly with NENS)	TCM 89/32		1990
10. Technical report assessing the rehabilitation, decommissioning and disposal alternatives for a nuclear reactor after a serious accident	CS 89 TCM 90/24		1991
11. Safety guide on planning for and control of the clean-up of very large areas after a serious accident at a nuclear facility (jointly with NENS)	TCM 89/33		1990

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1989-1990

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1989-90, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

<u>1989</u>	<u>Table</u>
1. Technical Committee on assessment of uranium resources and supply	73, No. 1
2. Technical Committee on uranium provinces of Asia and the Pacific	73, No. 6
3. Technical Committee on the use of uranium deposit models in resource assessment	73, No. 7
4. Advisory Group on effects of new enrichment technologies on uranium and uranium hexafluoride demand	74, No. 4
5. Advisory Group on safety aspects of production, handling, transport and storage of uranium hexafluoride	74, No. 6
6. Advisory Group on planning nuclear fuel cycle activities in developing countries	74, No. 7
7. Technical Committee on relation of corrosion behaviour to the physico-chemical properties of zirconium alloys in a water reactor environment	75, No. 1
8. Technical Committee on improvements in fuel utilization and recycling of plutonium and uranium	75, No. 5
9. Technical Committee on fuel performance under extended burnup conditions	75, No. 6
10. Advisory Group on advanced fuel technology and performance: current status and prospects	75, No. 11
11. IWG on Fuel Performance and Technology	75, No. 20
12. Technical Committee on the improvement of structural materials' resistance to chemical degradation and irradiation in the back end of the fuel cycle	76, No. 5
13. Advisory Group on the economics of spent fuel storage	76, No. 6
14. Technical Committee on decontamination of transport casks and of spent fuel storage facilities	76, No. 9
15. Advisory Group on spent fuel management after nuclear accidents	76, No. 13

<u>1989</u>	<u>Table</u>
16. Technical Committee on topical problems of spent fuel treatment	76, No. 22
17. Advisory Group on design and operation of high-level waste vitrification and storage facilities	77, No. 2
18. Technical Committee on evaluation of bituminization techniques for solidification of radioactive concentrates	77, No. 7
19. Advisory Group on handling and retention of airborne radionuclides at nuclear power plants during abnormal operations	77, No. 11
20. Technical Committee on the chemical treatment of low- and intermediate-level liquid radioactive wastes	77, No. 13
21. Advisory Group on siting, design and construction of geological repositories for high-level and alpha-bearing radioactive waste	78, No. 1
22. Advisory Group on state-of-the-art review of the underground disposal of radioactive wastes	78, No. 6
23. Radioactive Waste Management Advisory Committee (WAMAC)	78, No. 8
24. Advisory Group on safety and performance assessment for the radioactive waste isolation system at entombed nuclear facilities	78, No. 11
25. Advisory Group on evaluation and optimization of post-accident sealing technology for nuclear facilities	78, No. 12
26. Advisory Group on practical application of exemption principles to radioactive waste disposal in the terrestrial environment (jointly with NENS)	78, No. 19
27. Advisory Group on assessment of impact on man of mixed wastes from the nuclear fuel cycle	78, No. 25
28. Advisory Group on environmental impact assessment: techniques and uses in relation to the nuclear fuel cycle	78, No. 27
29. Advisory Group on the risks from sea dumping of radioactive wastes compared with other risks, including those from non-radioactive waste disposal	78, No. 30
30. Technical Committee on monitoring for compliance with criteria related to waste management, decommissioning termination survey or unrestricted use criteria	79, No. 1

<u>1989</u>	<u>Table</u>
31. Technical Committee on the use of remotely operated equipment in the decommissioning, rehabilitation, isolation or disposal of nuclear facilities after normal operation or a serious accident	79, No. 3
32. Technical Committee on the safe transport, disposal and stabilization of very large volumes of contaminated material from the clean-up of large areas after a nuclear accident (jointly with NENS)	79, No. 9
33. Technical Committee on planning for and control of the clean-up of very large areas after a serious accident at a nuclear facility (jointly with NENS)	79, No. 11
<u>1990</u>	<u>Table</u>
1. Technical Committee on geochemical and radioelement maps of the world (jointly with UNESCO and IUGS)	73, No. 13
2. Technical Committee on uranium refining and conversion and the production of uranium dioxide powders and pellets	74, No. 3
3. Technical Committee on qualification of new zirconium alloys for improved corrosion resistance	75, No. 2
4. Technical Committee on post-irradiation examination techniques and experience, and feedback to fuel fabrication and behaviour	75, No. 7
5. Technical Committee on decontamination and other means to reduce activity and crud buildup or to increase reactor lifetime	75, No. 8
6. Advisory Group on influence of primary circuit materials on core crud build-up	75, No. 9
7. Advisory Group on spent fuel management: current status and prospects	76, No. 1
8. Technical Committee on topical problems of spent fuel storage	76, No. 10
9. Advisory Group on spent fuel management after nuclear accidents	76, No. 13
10. Advisory Group on economics of the back end of the nuclear fuel cycle	76, No. 17
11. Technical Committee on remote fuel fabrication technology using recycled fissile materials (including safety aspects)	76, No. 19

<u>1990</u>	<u>Table</u>
12. Technical Committee on concepts for the conditioning of spent fuel for final waste disposal	77, No. 3
13. Technical Committee on volume reduction technologies for low- and intermediate-level solid wastes	77, No. 6
14. Advisory Group on management of radioactive waste generated during unplanned or accident situations at nuclear power plants	77, No. 10
15. Advisory Group on packaging of low- and intermediate-level radioactive waste	77, No. 12
16. Advisory Group on operation, shutdown and closing of deep geological repositories	78, No. 2
17. Radioactive Waste Management Advisory Committee (WAMAC)	78, No. 8
18. Advisory Group on standards for underground disposal of radioactive waste, and guides to the standards	78, No. 13
19. Advisory Group on practical application of exemption principles to radioactive waste disposal in the terrestrial environment (jointly with NENS)	78, No. 19
20. Advisory Group on application of exemption principles to radioactive waste disposal in the marine environment	78, No. 20
21. Advisory Group on practical procedures for assessing the radiological impact of wastes from radioisotope use in medicine, research and industry	78, No. 26
22. Advisory Group on the assessment and control of radionuclide discharges to rivers and coastal waters (jointly with NENS)	78, No. 28
23. Advisory Group on the design of impoundment and disposal facilities for mining and milling tailings, conditioning of tailings for disposal, and the methodology and technology used in the rehabilitation and stabilization of tailings piles	79, No. 6
24. Technical Committee on assessing the rehabilitation, decommissioning and disposal alternatives for a nuclear reactor after a serious accident	79, No. 10

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D I V I S I O N O F N U C L E A R S A F E T Y

ACTIONS PLANNED FOR 1989-90

Table 80

Area of Activity H.1

Basic Principles and Criteria

Task	Action or source	Services needed	Year of completion
PROJECT H.1.01: BASIC RADIATION PROTECTION CRITERIA FOR ANTICIPATED SITUATIONS			
1. Symposium on radiation protection infrastructure (1990)			Proceedings, 1990
2. Safety standards for exemption from the BSS	CS 89 AGM 90/1		1990
3. Safety guide on the application of radiation protection principles to sources of potential exposure	CS 88 AGM 88		1989
4. Technical document on basic issues to be revised in the BSS	CS 90		1990
PROJECT H.1.02: BASIC RADIATION PROTECTION CRITERIA FOR UNANTICIPATED SITUATIONS			
5. Safety standards - Principles for the alleviation of radiation exposure of the public in situations where the source of exposure cannot be regulated	CS 88, 89 AGM 89/1		1991
6. Safety guide on criteria for re-entry into affected facilities and off-site areas for recovery operations after a nuclear accident	CS 88, 90 AGM 89/2		1990
7. Safety standards - Revision of Safety Series No. 72 and 81 on derived intervention levels for application in controlling radiation doses to the public in the event of a nuclear accident or radiological emergency	CS 89 AGM 89/3		1989
PROJECT H.1.03: STRENGTHENING RADIATION PROTECTION INFRASTRUCTURES			
<u>Area of Concentration A: Establishing regulations</u>			
8. Technical document - System of regulations for radiation protection	CS 89, 90		1990
9. Safety manual - Glossary of terms for radiation protection and nuclear safety (jointly with I.1.02)	CS 89 AGM 89/4		1990
<u>Area of Concentration C: Promoting research and development</u>			
10. Internal report reviewing the safety research sponsored by the Agency (jointly with I.1.02)	TCM 89/5		1989/90
11. Technical report on the results of Agency-sponsored research (jointly with I.1.02)	CS 89, 90		Annually
12. Health Physics Research Abstracts			Annually
<u>Area of Concentration D: Providing training and support for TC activities</u>			
13. Technical document on training course syllabuses and fellowship activities (jointly with I.1.02)	TCM 89/6 CS 89, 90		Annually
14. General courses on radiation protection and nuclear safety (2-3 annually) (jointly with I.1.02)	TC		Annually
15. Three-five workshops annually on specific radiation protection aspects	TC		Annually
16. Regional seminar on regulatory aspects and enforcement of radiation protection (1989)			Summary report, 1989

Table 80 (Cont.)	Task	Action or source	Services needed	Year of completion
17.	Support for 20-30 TC projects, including regional and inter-regional projects (jointly with I.1.02)	TC		
<u>Area of Concentration E: Radiation protection advisory teams</u>				
18.	RAPAT (12) and associated (3) missions annually	TC		Annually

Table 81

Area of Activity H.2 Occupational Radiation Protection

Task	Action or source	Services needed	Year of completion
PROJECT H.2.01: GUIDELINES FOR RADIATION PROTECTION IN DESIGN AND OPERATIONS			
1. Safety guide on the design of radiation protection systems	CS 88, 90 AGM 89/7		1990
2. Technical information documents - methodology guidelines on radiation protection (10 annually)	CS 89, 90 AGM 90/2		1993
3. Safety manual on protective clothing for personnel involved in operations in the presence of very high levels of contamination	AGM 89/8 CS 90		1990
4. Technical report on probability of causation of effects from radiation exposure	CS 90		1992
5. Technical document on fusion safety	TCH 89/9		1989
6. Support for 20-25 TC projects	TC		
PROJECT H.2.02: GUIDELINES FOR OCCUPATIONAL MONITORING			
7. Establishment of a data base on occupational radiation exposure statistics	CS 88, 90		1990
8. Technical document on beta and gamma spectra and detector responses for radiation protection purposes	TCH 90/3		1991
9. Safety guide on the minimum requirements for personnel monitoring	CS 89		1990
10. CRP on intercomparison of personnel dosimeters (1989-91)			1991
11. Support for 20-25 TC projects	TC		

Table 82

Area of Activity H.3 Environmental Assessment and Protection

Task	Action or source	Services needed	Year of completion
PROJECT H.3.01: GUIDELINES ON THE LIMITATION OF RELEASES TO THE ENVIRONMENT			
1. Safety guide on principles for limiting releases of radioactive materials from nuclear power plants and reprocessing plants	AGM 88 CS 88, 89		1989

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Table 82 (Cont.)	Task	Action or source	Services needed	Year of completion
2.	Technical document giving guidance on the application of Agency models for individual and collective dose assessment to specific environmental problems (jointly with NENF)	AGM 89/10 CS 89, 90		1991
3.	Technical document establishing source upper bounds for specific practices	TCM 89/11		1990
4.	Support for TC projects	TC		

PROJECT H.3.02: ENVIRONMENTAL MONITORING

Area of Concentration A: Guidelines for environmental monitoring

5.	Safety guide on controlling consumer products containing radioactive substances	CS 88, 89 AGM 88 AGM 90/4		1991
6.	Safety guide on off-site radiological monitoring following a nuclear accident	AGM 88 CS 89		1990
7.	Symposium on environmental contamination following a major nuclear accident (1989) (including aspects of foodstuff contamination)	CS 89		Proceedings, 1990
8.	CRP on radon in the natural environment (1989-91)			1991
9.	Support for 20-25 TC projects	TC		

Area of Concentration B: Assessing the implications of post-accident environmental measurements

10.	Support for CRP on the validation of models for the transfer of radionuclides in the terrestrial, aquatic and urban environments (1988-92) (jointly with NENF - see Project C.2.07))	CS 89, 90		1992
11.	Establishment of a data base for the validation of radionuclide transport models (joint study with WMO)	CS 89 TCM 90/5	Data processing	1990
12.	Maintenance of environmental monitoring data base for use in assessing, a posteriori, the radiological impact of a severe nuclear accident	CS 89	Data processing	Continuing
13.	Technical document and supporting computer code for assessing the results of environmental measurements	CS 89, 90	Data processing	1990
14.	Safety manual on the rapid reporting, compiling and collating of large quantities of data after a nuclear accident	AGM 89/12		1990
15.	Safety manual on the alleviation of the longer-term adverse effects of accidental releases of radioactivity into the agricultural environment	CS 89, 90 AGM 90/6		1991

Table 83

Area of Activity H.4 Safe Transport of Radioactive Materials

	Task	Action or source	Services needed	Year of completion
PROJECT H.4.01: MAINTENANCE OF THE TRANSPORT REGULATIONS				
1.	Supplement to Safety Series No. 6, Regulations for the Safe Transport of Radioactive Material (including corresponding supplementary texts for Safety Series No. 7, No. 37 and No. 80)	CS 89, 90 TCM 89/13 TCM 89/14 TCM 90/7		1990

Table 83 (Cont.)	Task	Action or source	Services needed	Year of completion
2.	Safety guide on optimization of radiation protection in transport	CS 89 TCM 90/8		1990
3.	Technical document on sample optimization for demonstrating compliance with the BSS	TCM 90/8		1990
4.	CRP on the radiation protection implications of transport accidents involving radioactive material (1988-89)			1989
5.	Safety guide on the safe transport of uranium hexafluoride	CS 88 TCM 88		1989
6.	Technical document on high-consequence/low-probability transport accidents	CS 88, 89 TCM 88 AGM 90/9		1990

PROJECT H.4.02: IMPLEMENTATION OF THE TRANSPORT REGULATIONS

7.	Technical document-Updating of the list of national competent authorities for transport			1989/90
8.	Technical document-Updating of the directory of competent authorities' approval certificates			1989/90
9.	Upgrading of computer code (INTERTRAN) on radiation exposure in transport	CS 88 CRP 88-90		1991
10.	Updating of the technical document on the assessment of the radiological impact of the transport of radioactive material	TCM 88		1989
11.	Maintenance of data base on transport accidents and incidents	CS 88 TCM 88	Data processing	Continuing
12.	Maintenance of data base on shipment of radioactive material	CS 88 TCM 88	Data processing	Continuing
13.	Safety guide on quality assurance measures to facilitate compliance with the regulations for the safe transport of radioactive material	CS 89 AGM 89/15		1990

Table 84

Area of Activity H.5: Emergency Planning and Preparedness

	Task	Action or source	Services needed	Year of completion
PROJECT H.5.01: DEVELOPMENT OF GUIDELINES FOR EMERGENCY PLANNING AND PREPAREDNESS				
1.	Safety guide on emergency planning and preparedness for radiological accidents in fuel cycle facilities	CS 88, 90 AGM 89/16		1990
2.	Safety guide on emergency planning and preparedness for radiological accidents in research reactors	CS 88, 90 AGM 89/17		1990
3.	Technical report containing practical guidance on fire-fighting in a radiation environment	CS 89		1990
4.	Safety guide on radiation protection principles applying to the control of emergency workers under accident conditions at a nuclear facility	CS 88, 89 AGM 88 AGM 89/49		1990
5.	Technical report on the effectiveness of evacuation and sheltering measures after a nuclear accident, including thyroid blocking as a protective measure (in co-operation with WHO)	TCM 90/10 CS 90		1991

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Table 84 (Cont.)	Task	Action or source	Services needed	Year of completion
6.	Seminar on recovery operations in the event of a nuclear accident or radiological emergency (1989) (in co-ordination with NENF)			Summary report, 1989
PROJECT H.5.02: IMPLEMENTATION OF GUIDELINES FOR EMERGENCY PLANNING AND PREPAREDNESS				
7.	Interregional and regional training courses on planning, preparedness and response	TC		1989/90
8.	One advisory mission annually			1989/90
9.	Adaptation of real-time computer codes for use on small computers in an emergency	Contract		1990
10.	Two films on emergency preparedness, planning and response	Contract		1990/91
11.	Support for TC projects	TC		
PROJECT H.5.03: EMERGENCY ASSISTANCE SERVICES				
12.	Maintaining the Agency's emergency response capability (plans, procedures and in-house organizational infrastructure)			Continuing
13.	Technical document - IAEA revised emergency response and assistance arrangements for nuclear accidents or radiological emergencies	CS 89		1989
14.	Establishment of emergency assistance resource data base		Data processing	1990
15.	Development of software for handling radiological monitoring results under accident conditions		Data processing	1989

Table 85

Area of Activity H.6 Control of Radiation Sources

Task	Action or source	Services needed	Year of completion
PROJECT H.6.01: SAFE USE AND CONTROL OF RADIATION SOURCES			
1.	Set of technical information documents on radiation safety aspects of specific uses of industrial and medical radiation sources	CS 89, 90 AGM 89/18 AGM 90/11	1993
2.	Revision of Safety Series No.1 - Safe Handling of Radioisotopes, No. 20 - Safe Handling of Radioisotopes in Hydrology, No. 23 - Radiation Protection Standards for Radioluminous Timepieces, and No. 40 - Safe Use of Radioactive Tracers in Industrial Processes	CS 89, 90 AGM 90/12	1992
3.	Revision of Safety Series No. 39 - Safe Handling of Plutonium	CS 90 TCM 91	1993
4.	Revision of manual on radiation protection in hospitals and general practice - Vols. 1-4 (with WHO)	CS 89, 90	1991
5.	Technical report on the safety aspects of the design of gamma irradiation facilities	TCM 88 CS 89	1989

Table 85 (Cont.)	Task	Action or source	Services needed	Year of completion
6.	Safety manual on the practical application of exemption rules in relation to small sources and hospital wastes (in conjunction with NENF)			1990
7.	Technical document on notification of recipient countries when certain categories of radioactive material are exported and possible arrangements for the return of used sources to the supplier or a third party	CS 88 AGM 89/19		1990
8.	Technical documents - directories of radiation sources	Questionnaire		1990
9.	Interregional training course on regulation of radiation sources used in medicine, industry, research and teaching	TC		1989/90

Table 86

Area of Activity H.7 Radiation Safety of Nuclear Fuel-Related Activities

Task	Action or source	Services needed	Year of completion
PROJECT H.7.01: GUIDELINES ON RADIATION SAFETY OF NUCLEAR FUEL-RELATED FACILITIES [1]			
1.	Safety standards for mining and milling of radioactive ores	CS 90, 91 AGM 90/13	1991
2.	Safety manual on radiation safety in the mining and milling of radioactive ores	CS 90 TCM 91	1992
3.	Safety standards for hexafluoride production and fuel fabrication	CS 90 AGM 91	1992
4.	Safety manual on radiation safety in hexafluoride production and fuel fabrication plants	TCM 90/14 CS 91	1992
5.	Safety guide on radiation protection services in uranium refineries and nuclear fuel fabrication plants	AGM 88	CS 89 1989
6.	Regional training course on radiation protection in the mining and milling of radioactive ores	TC	1990
7.	Support for TC projects	TC	

[1] This project is a joint activity of NENS and NENF.

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Table 87

Area of Activity H.8 Exposure Assessment and Handling

Task	Action or source	Services needed	Year of completion
PROJECT H.8.01: GUIDELINES FOR THE MONITORING OF INTAKES OF RADIOACTIVE MATERIALS AND THE ASSESSMENT OF INTERNAL DOSES			
1. Safety standards for dose-per-unit-intake factors for members of the public	CRP 88-90 AGM 88 AGM 90/15		1991
2. Safety guide on the assessment of occupational intake of radioactive materials	CS 88		1989
3. Safety guide on basic methods for measuring incorporated radionuclides in man	TCM 89/20 CS 89		1991
4. Technical report - Guidelines on the rapid monitoring of large groups of internally contaminated people	TCM 89/21 CS 89		1990
5. Technical document on the use of a realistic chest phantom for the assessment of plutonium deposition in the lungs	CS 89		1990
PROJECT H.8.02: GUIDELINES FOR THE DIAGNOSIS, PROGNOSIS AND TREATMENT OF INDIVIDUALS EXPOSED TO RADIATION			
6. Technical document on advances in biological dosimetry	CS 88		1989
7. Technical document on schemes for the prognosis and treatment of radiation injuries	CS 89, 90		1990
8. CRP on biological dosimetry and evaluation (1989-91)			1991
9. Safety guide on the assessment and treatment of internal and external contamination	CS 89		1990
10. Maintenance of data base on registration of radiological accidents	Questionnaire		Continuing
11. Maintenance of data base on inventory of facilities for the treatment of overexposed persons	Questionnaire		Continuing
12. CRP on chromosomal aberration analysis (1988-89) (jointly with RILS)			1989
13. Support for TC project and training course	TC		

Table 88

Area of Activity I.1 Basic Principles and Criteria

Task	Action or source	Services needed	Year of completion
PROJECT I.1.01: BASIC SAFETY PRINCIPLES			
1. Technical documents - INSAG conclusions on policy and basic safety issues (3 annually)	AGMs 89/22 AGMs 90/16 CS 89, 90		Annually
2. Two technical documents on probabilistic safety criteria	CS 89, 90 TCM 89/23 TCM 90/17		1989/90
3. Technical document on the use of probabilistic safety criteria for operational safety	CS 90 TCM 91		1991

Table 88 (Cont.)	Task	Action or source	Services needed	Year of completion
PROJECT I.1.02: STRENGTHENING NUCLEAR SAFETY INFRASTRUCTURES				
<u>Area of Concentration A: Establishing regulations</u>				
4.	Internal reports - NUSSAG	TCM 89/24 TCM 90/18		Annually
5.	Advisory missions on regulatory systems			1989/90
6.	Guidelines for advisory missions on regulatory systems	CS 89		1989
7.	Compilation of national nuclear regulations			1990
<u>Area of Concentration B: Fostering general information exchange</u>				
8.	Annual Nuclear Safety Review (jointly with H.1.03)	CS 89, 90		Annually
9.	Meeting of senior radiation protection and nuclear safety experts during the General Conference (jointly with H.1.03)			Annually
<u>Area of Concentration C: Promoting research and development</u>				
10.	Technical document - Nuclear safety research abstracts (in co-operation with NEA/CEC) (jointly with H.1.03)	TCM 89/25 TCM 90/19		1990
11.	Agreement on use of computer safety codes and research results (IAEA, NEA, CEC, CMEA)	CS 89 AGM 89/26		1990

Table 89

Area of Activity I.2 Safe Siting, Design and Construction of Nuclear Installations

Task	Action or source	Services needed	Year of completion
PROJECT I.2.01: SITING OF NUCLEAR INSTALLATIONS			
1.	Technical document on site inputs for PSA	CS 89	1990
2.	Technical document on seismic safety margins for existing NPPs	CS 90	1990
3.	Establishment of a data base for seismic data for existing sites		1990
4.	Technical document on reassessment of existing reactor sites	CS 89	1989
5.	Safety manual on quality assurance in NPP siting (upgrading of a technical document)	CS 90	1992
6.	Training courses	TC	1989/90
7.	Support for 5-10 TC projects	TC	
PROJECT I.2.02: DESIGN AND CONSTRUCTION OF NUCLEAR INSTALLATIONS			
8.	Symposium on fire protection and fire-fighting at nuclear facilities (1989)		Proceedings, 1989
9.	Safety manual on safety assessment of fire protection design in NPPs	CS 89 AGM 90/20	1990
10.	Technical report on NPP design for fire protection and fire-fighting	CS 89, 90	1991
11.	Symposium on balancing automation and human action in nuclear power plants (1990)		Proceedings, 1990

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Table 89 (Cont.)	Task	Action or source	Services needed	Year of completion
12.	Safety guide on design aspects of accident management and containment considerations for severe accident mitigation	CS 90		1991
13.	Safety manual - topic to be recommended by NUSSAG	CS 90 AGM 90/21		1990
14.	Revision of safety guide - topic to be recommended by NUSSAG	CS 90		1991
15.	Regional training course on safety analysis	TC		1989
16.	Support for 5-10 TC projects	TC		

PROJECT I.2.03: PHYSICAL PROTECTION OF NUCLEAR INSTALLATIONS

17.	Technical report on trends in physical protection of nuclear installations and materials	CS 89 TCM 89/27		1990
18.	Annual training course on physical protection of nuclear facilities and materials	Extra-budgetary		1989/90

Table 90

Area of Activity I.3 Safe Operation of Nuclear Installations

	Task	Action or source	Services needed	Year of completion
PROJECT I.3.01: GUIDELINES FOR THE SAFE OPERATION OF NUCLEAR POWER PLANTS				
1.	Revision of safety guide on staffing of NPPs and the recruitment, training and authorization of personnel (SG-01)	CS 88, 89 CS 90 AGM 89/28		1990
2.	Revision of safety guides (topics to be identified by NUSSAG)	CS 89, 90 AGM 90/22		1990
3.	Interregional training courses on operational safety	TC		Annually
4.	Technical support for 5-10 TC projects	TC		

PROJECT I.3.02: SAFETY ASPECTS OF NUCLEAR POWER PLANT AGEING

5.	Technical reports on safety aspects of NPP ageing (including the state of the art, statistical information and its interpretation, and remedial actions)	TCM 89/29 TCM 90/23 AGM 90/24 CS 89, 90		1991
6.	Technical report on use of PSA in ageing assessment	CS 89, 90		1991

PROJECT I.3.03: OPERATIONAL SAFETY REVIEWS OF NUCLEAR POWER PLANTS

7.	14 OSART missions per year			1989/90
8.	Technical reports on operational safety findings	CS 89, 90 TCM 90/25		1989/90
9.	Technical document - OSART guidelines	CS 89 TCM 90/26		1990

Table 90 (Cont.)	Task	Action or source	Services needed	Year of completion
10.	Technical document - guidelines for the application of safety indicators	CS 89, 90		1990
11.	Technical document on safety experience in pressurized heavy water reactors	SPM 89/31		1989
PROJECT I.3.04: FEEDBACK OF OPERATIONAL SAFETY EXPERIENCE				
12.	Technical document on the exchange and assessment of recent safety-related events in NPPs (with NEA)	TCM 89/32 TCM 90/27		1989/90
13.	Technical document on IRS operations and assessment of specific types of incident	CS 90 TCM 90/28		1990
14.	Technical document on direct and root causes and generic lessons from unusual events reported to the IRS	ASSET missions		Annually
15.	Technical document on in-depth analysis of selected unusual events reported to the IRS	CS 89, 90 ASSET missions		Annually
16.	Maintaining IRS data base	CS 89, 90 TCM 89/33		Continuing
17.	Seminar on the use of IRS output in nuclear power plant safety (1990)	CS 89		Summary report, 1990
18.	Safety manuals on methodology of investigation/assessment of unusual events in NPPs, terminology of IRS reports and handling of IRS information on computers	CS 89, 90		1990
19.	Technical document on recommendations based on lessons learned from IRS information and PSA studies	CS 89 AGM 90/29		1991
20.	Support for 1-2 TC projects	TC		
21.	Four ASSET missions per year, including those related to above tasks			1989/90

PROJECT I.3.05: RESEARCH REACTORS

Area of Concentration A: Guidelines for the safe operation of research reactors (Additional guidance on details of the safety guide programme will be provided by an AGM in 1988)

22.	Seminar on safety aspects of research reactors and critical assemblies (including topics on renewal and upgrading) (jointly with RIPC) (1989)			Summary report, 1989
23.	Safety guide on research reactor safety criteria	TCM 88		1989
24.	Safety guide on research reactor safety assessment	TCM 89/34		1990
25.	Safety guide on modification and upgrading of research reactors	TCM 89/35		1990
26.	Safety guide on siting of research reactors	TCM 89/36		1990
27.	Safety guide on licensing and relicensing of research reactors	CS 89 AGM 90/30		1991
28.	CRP on failure rate of equipment at research reactors			1991
29.	Revision of safety standards for safe operation of research reactors and critical assemblies (Safety Series No. 35)	CS 89 AGM 90/31		1991
30.	Training course on research reactor operation and safety assessment	TC		1990
31.	Support for 5-10 TC projects	TC		

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Table 90 (Cont.)	Task	Action or source	Services needed	Year of completion
<u>Area of Concentration B: INSARR missions</u>				
	32. 8 INSARR missions annually			1989/90

Table 91

Area of Activity I.4 Accident Management and Mitigation

	Task	Action or source	Services needed	Year of completion
PROJECT I.4.01: STRATEGIES FOR ACCIDENT MANAGEMENT				
1.	Technical report on evaluating the vulnerability to severe accidents of water-cooled power reactors	CS 89, 90		1991
2.	Technical document on use of PSA results for severe accidents	TCM 89/37		1990
3.	CRP on severe accident management (including studies of radionuclide behaviour and release after a nuclear accident) (1988-90)			1990
4.	Technical report on symptom-oriented emergency procedures and accident management	CS 89, 90 TCM 90/32		1990
5.	Technical document - Content and methodology of accident management training (in co-operation with NENP)	CS 89, 90		1990
6.	Interregional training courses on accident management for plant management and senior operating staff (in co-operation with NENP)	TC		1989/90
PROJECT I.4.02: GUIDELINES FOR SEVERE ACCIDENT MITIGATION				
7.	Technical report on containment performance and integrity under severe accident conditions	CS 89, 90 TCM 90/33		1991
8.	CRP on containment integrity and effectiveness for accident conditions beyond design basis (1989-91)			1991
9.	Technical document on research into material interactions under severe accident conditions	CS 90		1991
10.	Technical document and subsequent safety document on safety aspects of reactivity transient accidents	CS 89, 90 TCM 90/34		1991
11.	Technical report on plant system utilization for accident mitigation	CS 89, 90 TCM 90/35		1991
12.	Advisory missions	TC		1989/90

Table 92

Area of Activity H/I.1 Safety Assessment Techniques

Task	Action or source	Services needed	Year of completion
PROJECT H/I.1.01: ASSISTANCE IN CONDUCTING ACCIDENT ANALYSIS			
1. Technical document on computer-aided safety analysis	TCM 89/38 TCM 90/36		1989/90
2. Technical document - Recommendations on advanced safety code application	CS 89, 90 TCM 90/37		1990
3. Training manual on source term code package (STCP)	CS 90 TC		1990
4. Modification of STCP for VVER-440 and VVER-1000 reactors	Contracts		1990
5. Support for 5-10 TC projects, including regional and inter-regional projects	TC		
PROJECT H/I.1.02: PROBABILISTIC SAFETY ASSESSMENT TECHNIQUES			
<u>Area of Concentration A: Development and implementation of guidance for conducting PSAs</u>			
6. Safety guide on specific PSA topics	CS 89 AGM 89/39		1991
7. CRP on reference studies on probabilistic modelling of accident sequences (1988-91)			1991
8. CRP on benchmark studies in relation to PSA case studies (1989-92)			1992
9. Technical report on collection and analysis of reliability data from NPP operational experience (jointly with NENP)	CS 89, 90 TCM 90/38		1991
10. Technical document on advances in reliability analysis in PSA	TCM 89/40 TC		1989
11. Interregional training course on PSA for nuclear power plant operation	TC		1989
12. Support for TC projects (including training and missions)			
<u>Area of Concentration B: Development of PSA applications</u>			
13. Technical documents on the use of PSA and related computer systems to enhance safety	CS 89 TCM 89/41 TCM 90/39		1990
14. Technical report on the use of PSA for evaluating new design and mitigation systems	CS 90 TCM 89/42		1991
15. CRP on data collection and analyses (1987-91)			1991
16. Series of technical reports on case studies	CS 89, 90 AGM 89/43		1989/91
17. Safety manual on case studies: assessment (PSA) in safety decisions	CS 89 AGM 90/40		1988/91
18. 1-2 advisory missions annually for independent review of plant-specific PSAs	TC		1989/90
PROJECT H/I.1.03: GUIDELINES FOR THE ASSESSMENT OF HUMAN RELIABILITY			
19. Technical documents on human error classification and data collection	CS 89 TCM 89/44		1990

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Table 92 (Cont.)	Task	Action or source	Services needed	Year of completion
20.	Technical document on cognitive information processing related to NPP operation	CS 90 TCM 90/41		1991
21.	Technical report on human reliability data collection and modelling	CS 89 TCM 90/42 TC [1]		1990
22.	Technical report on operator training for beyond design basis accidents	CS 90 TCM 90/43 TC [1]		1990
23.	Technical document on contribution of management to operational safety	CS 89 TCM 89/45		1990
24.	CRP to develop a human reliability data bank (1990-92)			1992
25.	Support for TC projects	TC		
<hr/>				
PROJECT H/I.1.04: RISK MANAGEMENT, COMPARATIVE ASSESSMENT AND DECISION-AIDING TECHNIQUES				
<hr/>				
<u>Area of Concentration A: Risk management</u>				
26.	Technical document - Risk management procedure guide	CS 89, 90 TCM 89/46		1991
27.	Development of risk data base on nuclear power and alternative energy sources	CS 89, 90 TCM 90/44		1990
28.	About six case studies	TC		1991
<u>Area of Concentration B: Decision-aiding techniques</u>				
29.	Technical reports on decision-aiding techniques for optimization of radiation protection and nuclear safety	CS 89, 90 ACM 89/47, 48 TCM 90/45		1991
30.	CRP on the use of decision-aiding techniques in safety decision-making (1990-92)			1992
<u>Area of Concentration C: Comparative assessment</u>				
31.	CRP on sensitivity studies of consequence modelling (1989-91)			1991
32.	Interregional training course on accident consequence assessment	TC		1989

[1] Data generated from an interregional TC project will also be used in preparing this report.

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1989-90

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1989-90, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

<u>1989</u>	<u>Table</u>
1. Advisory Group on principles for the alleviation of radiation exposure of the public in situations where the sources of exposure cannot be regulated	80, No. 5
2. Advisory Group on criteria for re-entry into affected facilities and off-site areas for recovery operations after a nuclear accident	80, No. 6
3. Advisory Group on derived intervention levels for application in controlling radiation doses to the public in the event of a nuclear accident or radiological emergency	80, No. 7
4. Advisory Group on glossary for radiation protection and nuclear safety	80, No. 9
5. Technical Committee to review the safety research sponsored by the Agency	80, No. 10
6. Technical Committee on co-ordination and review of syllabuses for training courses and fellowship activities	80, No. 13
7. Advisory Group on the design of radiation protection systems	81, No. 1
8. Advisory Group on protective clothing for personnel involved in operations in the presence of very high levels of contamination	81, No. 3
9. Technical Committee on selected aspects of fusion safety	81, No. 5
10. Advisory Group on guidance on the application of Agency models for individual and collective dose assessment to specific environmental problems	82, No. 2
11. Technical Committee on establishment of source upper bounds for specific practices	82, No. 3
12. Advisory Group on the rapid reporting, compiling and collating of large quantities of data after a nuclear accident	82, No. 14
13. Standing Advisory Group on the Safe Transport of Radioactive Materials (SAGSTRAM)	83, No. 1

<u>1989</u>	<u>Table</u>
14. Technical Committee - Regulatory review panel	83, No. 1
15. Advisory Group on quality assurance measures to facilitate compliance with the regulations for the safe transport of radioactive materials	83, No. 13
16. Advisory Group on emergency planning and preparedness for radiological accidents in fuel cycle facilities	84, No. 1
17. Advisory Group on emergency planning and preparedness for radiological accidents in research reactors	84, No. 2
18. Advisory Group on technical information documents on specific uses of industrial and medical radiation sources	85, No. 1
19. Advisory Group on notification of recipient countries when certain categories of radioactive material are exported and possible arrangements for the return of sources that have outlived their usefulness to the supplier or to a third party	85, No. 7
20. Technical Committee on basic methods for measuring incorporated radionuclides in man	87, No. 3
21. Technical Committee on the rapid monitoring of large groups of internally contaminated people	87, No. 4
22. Three meetings of International Nuclear Safety Advisory Group (INSAG)	88, No. 1
23. Technical Committee on probabilistic safety criteria	88, No. 2
24. Nuclear Safety Standards Advisory Group (NUSSAG)	88, No. 4
25. Technical Committee on nuclear safety research	88, No. 10
26. Advisory Group on agreement on use of safety codes and research results (IAEA, NEA, CEC, CMEA)	88, No. 11
27. Technical Committee on trends in physical protection of nuclear installations and materials	89, No. 17
28. Advisory Group on staffing of NPPs and the recruitment, training and authorization of operating personnel	90, No. 1
29. Technical Committee on safety aspects of NPP ageing	90, No. 5
30. Technical Committee on ageing mechanisms	90, No. 5
31. Specialists' meeting on exchange of safety experience in pressurized heavy water reactors	90, No. 11
32. Technical Committee on the exchange and assessment of recent unusual events in NPPs	90, No. 12

1989

Table

33.	Technical Committee on quality control of IRS inputs and handling of IRS information on computers	90, No. 16
34.	Technical Committee on research reactor safety assessment	90, No. 24
35.	Technical Committee on modification and upgrading of research reactors	90, No. 25
36.	Technical Committee on siting of research reactors	90, No. 26
37.	Technical Committee on use of PSA results for severe accidents	91, No. 2
38.	Technical Committee on computer-aided safety analysis	92, No. 1
39.	Advisory Group on specific PSA topics	92, No. 6
40.	Technical Committee on advances in reliability analysis in PSA	92, No. 10
41.	Technical Committee on the use of PSA and related computer systems to enhance safety	92, No. 13
42.	Technical Committee on the use of PSA for evaluating new design and mitigation systems	92, No. 14
43.	Advisory Group to develop series of technical reports containing case studies	92, No. 16
44.	Technical Committee on human error classification and data collection	92, No. 19
45.	Technical Committee on contribution of management to operational safety	92, No. 23
46.	Technical Committee on risk management procedures guide	92, No. 26
47.	Advisory Group on decision-aiding techniques for optimization of protection	92, No. 29
48.	Advisory Group on evaluation of decision-aiding techniques (including sample applications)	92, No. 29
49.	Advisory Group on radiation protection principles applying to the control of emergency workers under accident conditions at a nuclear facility	84, No. 4

1990

Table

1.	Advisory Group on exemptions from the Basic Safety Standards	80, No. 2
2.	Advisory Group on radiation protection methodology guidelines	81, No. 2

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1990

Table

3.	Technical Committee on beta and gamma spectra and detector responses for radiation protection purposes	81, No. 8
4.	Advisory Group on controlling consumer products containing radioactive substances	82, No. 5
5.	Technical Committee on establishment of data base for the validation of radionuclide transport models	82, No. 11
6.	Advisory Group on the alleviation of the longer-term adverse effects of accidental releases of radioactivity into the agricultural environment	82, No. 15
7.	Standing Advisory Group on the Safe Transport of Radioactive Materials (SAGSTRAM)	83, No. 1
8.	Technical Committee on optimization of radiation protection in transport	83, Nos 2 and 3
9.	Advisory Group on high consequence/low probability transport accidents	83, No. 6
10.	Technical Committee on the effectiveness of evacuation and sheltering after a nuclear accident	84, No. 5
11.	Advisory Group on technical information documents on radiation protection aspects of specific uses of industrial and medical radiation sources	85, No. 1
12.	Advisory Group to review and revise Safety Series Nos 1, 20, 23, 40	85, No. 2
13.	Advisory Group to develop safety standards for mining and milling of radioactive ores	86, No. 1
14.	Technical Committee on radiation safety in hexafluoride production and fuel fabrication plants	86, No. 4
15.	Advisory Group on dose-per-unit-intake factors for members of the public	87, No. 1
16.	Three meetings of INSAG	88, No. 1
17.	Technical Committee on probabilistic safety criteria	88, No. 2
18.	Nuclear Safety Standards Advisory Group (NUSSAG)	88, No. 4
19.	Technical Committee on preparation of nuclear safety research abstracts	88, No. 10
20.	Advisory Group on safety assessment of fire protection design in NPPs	89, No. 9
21.	Advisory Group on topic to be recommended by NUSSAG	89, No. 13

<u>1990</u>	<u>Table</u>
22. Advisory Group to revise safety guides to be determined by NUSSAG	90, No. 2
23. Technical Committee on safety aspects of NPP ageing	90, No. 5
24. Advisory Group on ageing monitoring during NPP operation	90, No. 5
25. Technical Committee - Biannual meeting of OSART users	90, No. 8
26. Technical Committee to revise OSART guidelines	90, No. 9
27. Technical Committee on the exchange and assessment of recent unusual events in NPPs	90, No. 12
28. Technical Committee on IRS operations and assessment of specific types of incident.	90, No. 13
29. Advisory Group to develop recommendations based on lessons learned from IRS information and PSA studies	90, No. 19
30. Advisory Group on licensing and relicensing of research reactors	90, No. 27
31. Technical Committee to revise Safety Series No. 35 on safe operation of research reactors and critical assemblies	90, No. 29
32. Technical Committee on symptom-oriented emergency procedures and accident management	91, No. 4
33. Technical Committee on containment performance and integrity under severe accident conditions	91, No. 7
34. Technical Committee on safety aspects of reactivity transient accidents	91, No. 10
35. Technical Committee on plant system utilization for accident mitigation	91, No. 11
36. Technical Committee on computer-aided safety analysis	92, No. 1
37. Technical Committee on recommendations on advanced safety code application	92, No. 2
38. Technical Committee on the collection and analysis of reliability data from NPP operational experience	92, No. 9
39. Technical Committee on the use of PSA and related computer systems to enhance safety	92, No. 13
40. Advisory Group on case studies: assessment (PSA) in safety decisions	92, No. 17

1990

Table

41.	Technical Committee on cognitive information processing related to NPP operation	92, No. 20
42.	Technical Committee on human reliability data collection and modelling	92, No. 21
43.	Technical Committee on operator training for beyond design basis accidents	92, No. 22
44.	Technical Committee on development of risk data base for nuclear power and alternative energy sources	92, No. 27
45.	Technical Committee on the practical use of decision-aiding techniques for optimization of protection	92, No. 29

D I V I S I O N O F S C I E N T I F I C A N D T E C H N I C A L I N F O R M A T I O N

ACTIONS PLANNED FOR 1989-90

Table 93

Programme S.5: Specialized Service Activities

Task	Action or source	Services needed	Year of completion
PROJECT S.5.2: INTERNATIONAL NUCLEAR INFORMATION SYSTEM			
1. Compilation of INIS data base		Data processing	Semi-monthly computer tapes. Quarterly compact disk
2. INIS Atomindex		Data processing	Semi-monthly
3. Microfilm document service			Continuing
4. Technical advice on system operation	TCM 89/1 TCM 90/1 AGM 89/3		1989/90
5. INIS training seminar (1989 and 1990)			1989/90
6. Updating of technical input-output procedures (INIS Reference Series)	TCM 89/2 TCM 90/2		Annually
7. Provision of NEA computer codes (on request)			Continuing

Table 94

Area of Activity A.3: Nuclear Power Systems Technologies

Task	Action or source	Services needed	Year of completion
PROJECT A.3.05: FUSION RESEARCH AND ENGINEERING			
1. Nuclear Fusion Journal		Data processing	Monthly
2. Anniversary issue (cumulative index)		Data processing	1990
3. Triennial technical report - World Survey of Activities in Controlled Fusion Research	Questionnaire	Data processing	1989

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1989-90

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1989-90, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

<u>1989</u>	<u>Table</u>
1. Seventeenth consultative meeting of INIS Liaison Officers	93, No. 4
2. Technical Committee on INIS subject scope	93, No. 6
3. INIS advisory group	93, No. 4
 <u>1990</u>	 <u>Table</u>
1. Eighteenth consultative meeting of INIS Liaison Officers	93, No. 4
2. Technical Committee on INIS input-output procedures	93, No. 6

APPROPRIATION SECTION 3

RESEARCH AND ISOTOPES

APPROPRIATION SECTION 3: RESEARCH AND ISOTOPES

Summary of cost

Table 95

Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	4 706 167	5 722 000	(41 000)	(0.7)	5 681 000	65 000	1.1	5 746 000	2.5	5 824 000	5.0	6 184 000
Temporary assistance - P	159 480	120 800	26 200	21.7	147 000	(24 000)	(16.3)	123 000	1.6	149 300	3.9	129 800
Salaries - established posts - GS & M&O	3 144 707	3 275 000	(106 000)	(3.2)	3 169 000	2 000	0.1	3 171 000	10.5	3 502 000	4.0	3 645 000
Temporary assistance - GS & M&O	112 415	104 900	16 900	16.1	121 800	-	-	121 800	9.0	132 800	3.0	136 800
Common staff costs	2 612 073	3 025 400	30 600	1.0	3 056 000	15 000	0.5	3 071 000	6.9	3 267 800	4.6	3 432 900
Overtime	56 148	47 600	20 400	42.9	68 000	1 000	1.5	69 000	9.0	74 100	2.9	77 400
Sub-total: Staff costs	10 790 990	12 295 700	(52 900)	(0.4)	12 242 800	59 000	0.5	12 301 800	5.8	12 950 000	4.5	13 605 900
Travel	1 249 405	1 698 700	78 200	4.6	1 776 900	(184 000)	(10.4)	1 592 900	1.0	1 794 700	1.0	1 624 900
Representation and hospitality	21 358	26 400	(200)	(0.8)	26 200	-	-	26 200	1.9	26 700	1.9	27 200
Training	6 901	19 400	(7 800)	(40.2)	11 600	-	-	11 600	0.9	11 700	5.1	12 300
Experts	34 884	304 700	(2 400)	(0.8)	302 300	(19 000)	(6.3)	283 300	1.0	305 300	1.0	288 900
Equipment: leased or rented	80 810	110 000	500	0.5	110 500	2 000	1.8	112 500	2.3	113 000	3.4	119 000
Equipment: purchased (construction)	835 388	737 100	(121 600)	(16.5)	615 500	(3 000)	(0.5)	612 500	4.6	644 000	4.6	670 000
Supplies and materials	690 754	649 100	(36 600)	(5.6)	612 500	(36 000)	(5.9)	576 500	4.8	641 800	4.8	633 000
General operating expenses	1 339 782	1 543 400	(24 400)	(1.6)	1 519 000	33 000	2.2	1 552 000	3.5	1 572 200	3.5	1 662 500
Contracts	34 178	21 000	44 000	209.5	65 000	-	-	65 000	-	65 000	3.1	67 000
Research and technical contracts	1 774 662	1 922 000	125 000	6.5	2 047 000	(101 000)	(4.9)	1 946 000	2.5	2 098 000	2.5	2 045 000
Miscellaneous	191 670	314 500	29 200	9.3	343 700	(9 000)	(2.6)	334 700	2.0	350 600	2.0	348 300
Sub-total: Other direct costs	6 259 792	7 346 300	83 900	1.1	7 430 200	(317 000)	(4.3)	7 113 200	2.6	7 623 000	2.7	7 498 100
Conference services	147 695	187 000	-	-	187 000	(13 000)	(7.0)	174 000	7.0	200 000	4.2	194 000
Interpretation services	99 507	115 000	(25 000)	(21.7)	90 000	45 000	50.0	135 000	2.2	92 000	4.4	144 000
Translation and records services	348 337	408 000	(70 000)	(17.2)	338 000	21 000	6.2	359 000	4.7	354 000	4.6	393 000
Printing and publishing services	1 291 792	1 355 000	(203 000)	(15.0)	1 152 000	(149 000)	(12.9)	1 003 000	7.4	1 237 000	4.1	1 121 000
Data processing services	430 000	434 000	34 000	7.8	468 000	7 000	1.5	475 000	4.7	490 000	3.8	516 000
Contract administration	381 447	290 000	-	-	290 000	-	-	290 000	6.9	310 000	3.9	322 000
Laboratory services	(1 957 066)	(2 180 000)	-	-	(2 180 000)	-	-	(2 180 000)	6.2	(2 315 000)	4.2	(2 413 000)
Sub-total: Shared costs	741 712	609 000	(264 000)	(43.3)	345 000	(89 000)	(25.8)	256 000	6.7	368 000	1.4	277 000
T O T A L	17 792 494	20 251 000	(233 000)	(1.2)	20 018 000	(347 000)	(1.7)	19 671 000	4.6	20 941 000	3.9	21 381 000

APPROPRIATION SECTION 3: RESEARCH AND ISOTOPES

Expenditure by Division

Table 96

Division	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Food and Agriculture	6 876 821	7 622 000	28 000	0.4	7 650 000	(124 000)	(1.6)	7 526 000	4.8	8 015 000	3.8	8 189 000
Life Sciences	3 840 918	4 391 000	(309 000)	(7.0)	4 082 000	(39 000)	(1.0)	4 043 000	4.1	4 249 000	3.8	4 370 000
Physical and Chemical Sciences	7 074 755	8 238 000	48 000	0.6	8 286 000	(184 000)	(2.2)	8 102 000	4.7	8 677 000	4.0	8 822 000
The Laboratory a/	[6 192 379]	[6 598 000]	[(200 000)]	[(3.0)]	[6 398 000]	-	-	[6 398 000]	[6.2]	[6 795 000]	[4.2]	[7 080 000]
Total Appropriation Section	17 792 494	20 251 000	(233 000)	(1.2)	20 018 000	(347 000)	(1.7)	19 671 000	4.6	20 941 000	3.9	21 381 000

a/ Cost included in the above three Divisions

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THE LABORATORY

Table 97

	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Total Laboratory	8 149 445	8 778 000	(200 000)	(2.3)	8 578 000	-	-	8 578 000	6.2	9 110 000	4.2	9 493 000
Safeguards Analytical Laboratory (charged to Safeguards)	1 957 066	2 180 000	-	-	2 180 000	-	-	2 180 000	6.2	2 315 000	4.2	2 413 000
Total charged to Research and Isotopes	6 192 379	6 598 000	(200 000)	(3.0)	6 398 000	-	-	6 398 000	6.2	6 795 000	4.2	7 080 000
Consists of:												
Food and Agriculture	3 098 824	3 293 000	-	-	3 293 000	-	-	3 293 000	6.2	3 497 000	4.2	3 644 000
Life Sciences	790 258	839 000	(200 000)	(23.8)	639 000	-	-	639 000	6.2	679 000	4.2	707 000
Physical and Chemical Sciences	2 303 297	2 466 000	-	-	2 466 000	-	-	2 466 000	6.2	2 619 000	4.2	2 729 000

RESEARCH AND ISOTOPES

APPROPRIATION SECTION 3: RESEARCH AND ISOTOPES

Manpower by Division

Table 98

Division	1988 Adjusted				1989			
	P	GS	M&O	Total	P	GS	M&O	Total
Food and Agriculture	17	8	-	25	17	8	-	25
Life Sciences	15	10	-	25	15	10	-	25
Physical and Chemical Sciences	27	18	-	45	27	18	-	45
Laboratory	28	58	25	111	28	58	25	111
Total Appropriation Section	87	94	25	206	87	94	25	206

JOINT FAO/IAEA DIVISION OF ISOTOPE AND RADIATION APPLICATIONS OF ATOMIC
ENERGY IN FOOD AND AGRICULTURAL DEVELOPMENT

ACTIONS PLANNED FOR 1989-90

Table 99

Area of Activity D.1 Soil Fertility

Task	Action or source	Services needed	Year of completion
PROJECT D.1.01: OPTIMIZING THE USE OF WATER, FERTILIZER AND SOIL RESOURCES			
<u>Area of Concentration A: Soil-water studies</u>			
1. CRP on evaluation of nuclear techniques compared with traditional methods in soil-water studies (1986-90)		Laboratory	1990
2. Annual training course on soil-water-plant relationships	TC	Laboratory	Annually
<u>Area of Concentration B: Grain legumes</u>			
3. CRP on improving yield and N ₂ fixation of grain legumes in South America (1986-90) (also serves objectives of D.2.01)		Laboratory	1990
4. CRP on improving yield and N ₂ fixation of grain legumes in South East Asia (1988-92) (also serves objectives of D.2.01)		Laboratory	1992
5. Training course on biological N ₂ fixation for Africa	TC	Laboratory	1989
6. CRP on isotopic studies of nitrogen fixation and cycling in blue green Algae and Azolla (1985-89)	Extra-budgetary [1]		1989
<u>Area of Concentration C: Tree crops</u>			
7. CRP on optimization of N ₂ fixation by tree crops (1988-92)		Laboratory	1992
8. Training course on the study of trees and soil fertility	TC	Laboratory	1990
<u>General</u>			
9. Soils Newsletter (relates also to D.1.02)			Annually
10. Support for 50-65 TC projects and individual fellowships	TC	Laboratory	
PROJECT D.1.02: IMPROVING THE PRODUCTIVITY OF SALINE, ACIDIC AND OTHER DELETERIOUS SOILS			
11. CRP on nuclear techniques to improve crop production in salt-affected soils (1985-92)		Laboratory	1992
12. Support for 2-5 TC projects and individual fellowships	TC	Laboratory	

[1] Indicates substantial or full funding from extrabudgetary sources.

Table 100

Area of Activity D.2Plant Breeding and Genetics

Task	Action or source	Services needed	Year of completion
PROJECT D.2.01: ESTABLISHED MUTATION BREEDING TECHNOLOGY FOR IMPROVEMENT OF SEED PROPAGATED PLANTS			
<u>Area of Concentration A: Cereals, legumes and oil crops</u>			
1. CRP on improvement of rice and other cereals through mutation breeding in Latin America (1986-91)		Laboratory	1991
2. CRP on improvement of oil seeds and industrial crops by induced mutations (1989-93)	Extra budgetary		1993
3. CRP on induced mutations for sesame improvement (1989-93)	Extra-budgetary		1993
<u>Area of Concentration B: Indigenous grain crops in Africa</u>			
4. CRP on improvement of basic food crops in Africa through plant breeding including the use of induced mutations (1988-93) (also serves objectives of D.2.02)	Extra-budgetary	Laboratory	1993
<u>Area of Concentration C: Information on mutant germ-plasm</u>			
5. Maintenance of data base on mutant germ-plasm (relates also to D.2.02)		Data processing	Continuing
6. Mutation Breeding Newsletter (relates also to D.2.02)			Semi-annually
<u>General</u>			
7. Symposium on the contribution of plant mutation breeding to crop improvement (1990)			Proceedings, 1990
8. Training course on the induction and use of mutations in plant breeding	TC	Laboratory	1989/90
9. Support for 20-25 TC projects and 20 fellowships	TC	Laboratory	
PROJECT D.2.02: ADVANCED MUTATION BREEDING TECHNOLOGY USING IN VITRO CULTURE			
<u>Area of Concentration A: Vegetatively propagated species in tropical countries</u>			
10. CRP on the improvement of root and tuber crops, plantains and bananas in tropical countries by induced mutations (1988-93)		Laboratory	1993
11. Training course on mutation breeding of vegetatively propagated crops using in vitro culture	Extra-budgetary	Laboratory	1990
<u>Area of Concentration B: Improved tolerance of adverse factors</u>			
12. CRP on tissue culture applications through mutation breeding to increase resistance in rice against adverse soil factors (1989-93)	Extra-budgetary		1993
13. CRP on use of induced mutations and in vitro culture techniques for improving crop plant resistance to diseases (1989-93)		Laboratory	1993
<u>Area of Concentration C: Modern genetics in plant breeding</u>			
14. CRP on use of induced mutations in connection with haploids and heterosis in cereals (1987-92)		Laboratory	1992
15. Technical document on the application of mutations and tracers in modern genetics for plant breeding	AGM 90/1		1990
<u>General</u>			
16. Support for 10-15 TC projects and at least 20 fellowships	TC	Laboratory	

Table 101Area of Activity D.3 Animal Production and Health

Task	Action or source	Services needed	Year of completion
PROJECT D.3.01: OPTIMIZATION OF THE REPRODUCTIVE EFFICIENCY OF LIVESTOCK			
1. CRP on immunoassay techniques to improve reproductive efficiency and health status of indigenous African livestock (1988-92) (also serves the objectives of D.3.03)	Extra-budgetary	Laboratory	1992
2. CRP on nuclear techniques to improve domestic buffalo production in Asia-Phase II (1985-89)(also serves objectives of D.3.02)		Laboratory	1989
3. CRP on strengthening animal reproduction and disease diagnosis in Asia through the application of immunoassay techniques (1989-93) (also serves the objectives of D.3.03)		Laboratory	1993
4. CRP on regional network for improving the reproductive management of meat and milk-producing livestock in Latin America with the aid of RIA (1989-93)	Extra-budgetary	Laboratory	1993
5. Training course on nuclear and related techniques in animal reproduction and disease diagnosis	TC	Laboratory	1990
6. Regional seminar for Africa on improving health and reproductive efficiency of livestock through RIA and related techniques (1989) (also serves objectives of D.3.03)			Summary report, 1989
7. Animal Production and Health Newsletter (also relates to D.3.02 and D.3.03)			Semi-annually
8. Bibliographic information services (also relates to D.3.02 and D.3.03)	VIC Library		1993
9. Support for 15-20 TC projects and individual fellowships	TC	Laboratory	
PROJECT D.3.02. IMPROVEMENT OF THE NUTRITION OF RUMINANT LIVESTOCK			
10. CRP on development of feeding strategies for improving ruminant productivity in areas of fluctuating nutrient supply through the use of nuclear and related techniques (1989-93)		Laboratory	1993
11. Technical report on ruminant nutrition	AGM 89/1		1989
12. Training course on nuclear and related techniques in animal nutrition	TC	Laboratory	1989
13. Support for about 10 TC projects	TC	Laboratory	1993
PROJECT D.3.03: DIAGNOSIS AND CONTROL OF LIVESTOCK DISEASES			
14. CRP on improving the diagnosis and control of infectious and parasitic diseases of livestock in developing countries with the aid of RIA and related techniques (1988-92)	Extra-budgetary	Laboratory	1992
15. CRP on establishment of a unified approach to the diagnosis of animal diseases in the Mediterranean, Middle East and North African regions through the use of nuclear and related immunoassay techniques (1989-93)	Extra-budgetary	Laboratory	1993
16. Training course on nuclear and related techniques in disease diagnosis	TC	Laboratory	1990
17. Support for some 20 TC projects	TC	Laboratory	

Table 102Area of Activity D.4 Insect and Pest Control

Task	Action or source	Services needed	Year of completion
PROJECT D.4.01: CONTROL OR ERADICATION OF FRUIT FLIES			
1. CRP on fruit fly genetic sexing for SIT projects (1988-93)		Laboratory	1993
2. CRP on standardization of medfly trapping (1986-90)		Laboratory	1990
3. CRP on medfly attractants for SIT projects (1989-91)	Extra-budgetary	Laboratory	1991
4. Latin America regional CRP on control or eradication of fruit flies using nuclear techniques (1989-93)	Extra-budgetary	Laboratory	1993
5. Regional seminar on the sterile technique for fruit fly control or eradication in Latin America (1989)			Summary report, 1990
6. Regional training course on fruit fly control (Latin America)	TC		1989
7. Interregional training course on nuclear techniques for insect control (also serves objectives of D.4.02 and D.4.03)	TC		1990
8. Newsletter (relates also to D.4.02 and D.4.03)			Semi-annually
9. Support for 4-6 TC projects and individual fellowships	TC	Laboratory	
PROJECT D.4.02: ERADICATION OF TSETSE FLIES			
10. CRP on tsetse SIT for area-wide control (1988-93)		Laboratory	1993
11. Training course on tsetse rearing techniques	TC	Laboratory	1989/90
12. Regional training course (Africa) on SIT for tsetse fly control/eradication	TC		1990
13. Training manual on SIT for tsetse control/eradication (English - 1989, French - 1990)			1989/90
14. Support for 8-10 TC projects and individual fellowships	TC	Laboratory	
PROJECT D.4.03: NEW TECHNIQUES FOR CONTROLLING MAJOR INSECT PESTS			
15. CRP on radiation-induced F ₁ sterility in Lepidoptera for area-wide control (1987-91)	CS 89	Laboratory	1991
16. CRP on genetic engineering technology for the improvement of the SIT (1988-92)	Extra-budgetary AGM 89/2	Laboratory	1992
17. Support for 1-2 TC projects and individual fellowships	TC	Laboratory	

Table 103Area of Activity D.5 Agrochemicals and Residues

Task	Action or source	Services needed	Year of completion
PROJECT D.5.01: MONITORING PESTICIDE RESIDUES IN FOOD AND THE ENVIRONMENT			
<u>Area of Concentration A: Measurement and fate of contaminants</u>			
1. CRP on radiotracer studies of fungicide residues in food plants (1985-89)		Laboratory	1989
2. CRP on radiotracer studies of DDT in tropical environments (1989-94)	Extra-budgetary	Laboratory	1994
3. CRP on radiotracer studies to reduce or eliminate pesticide residues during food processing (1988-93)		Laboratory	1993
4. CRP on the environmental fate of molluscicides (1990-95)		Laboratory	1995
5. CRP on volatilization of agrochemicals as a potential source of atmospheric pollution (1989-93)	Extra-budgetary	Laboratory	1993
6. CRP on ecological effects and biological availability of organic pollutants in soils (1989-93)	Extra-budgetary	Laboratory	1993
7. CRP on biological activity and bioavailability of bound pesticide residues using nuclear techniques (1986-91)		Laboratory	1991
8. Training courses on nuclear techniques in pesticide research, including new training manual	TC		1989/90
<u>Area of Concentration B: Improved formulation of agrochemicals</u>			
9. CRP on development and evaluation of controlled-release formulation of pesticides to reduce residues and increase efficacy, using radioisotopes (1983-89)	Extra-budgetary	Laboratory	1989
<u>Area of Concentration C: Chemical approaches for pest control</u>			
10. CRP on isotope-aided research on the use of attractants, pheromones and pesticides combined in controlled-release formulations for control of specific insects (1989-94)		Laboratory	1994
<u>General</u>			
11. Agrochemicals Newsletter (relates also to D.5.02 and D.5.03)			Semi-annually
12. Support for some 15 TC projects and individual fellowships	TC	Laboratory	
PROJECT D.5.02: BIOCONVERSION OF LIGNOCELLULOSIC AGRICULTURAL RESIDUES			
13. CRP on screening of indigenous microorganisms for lignocellulosic fractionating activity (1987-91)	Extra-budgetary	Laboratory	1991
14. Training course on screening of microbes for ligninolytic activity	Extra-budgetary	Laboratory	1990
15. Evaluation of upgraded agricultural residues for animal feed	Extra-budgetary	Laboratory	1992
16. Interregional seminar on the bioconversion of agricultural residues using nuclear techniques (1989)	Extra-budgetary		Summary report, 1989
17. Support for TC projects and individual fellowships	TC		

RESEARCH AND ISOTOPES

Table 103 (Cont.)	Task	Action or source	Services needed	Year of completion
PROJECT D.5.03: ALLEVIATING THE ADVERSE EFFECTS OF ACCIDENTAL RELEASES OF RADIONUCLIDES INTO THE AGRICULTURAL ENVIRONMENT				
18.	Technical document on radionuclide behaviour in the agricultural environment, with emphasis on techniques for preventing entry into food chains	CS 89, 90	Laboratory	1991
19.	Training for food controllers on evaluation of radionuclide contamination of food	Extra-budgetary	Laboratory	1990
20.	CRP on radionuclide behaviour in fragile agricultural environments, and minimization of entry of radionuclides into food chains (1989-93)	Extra-budgetary	Laboratory	1993
21.	CRP on prevention of radionuclide contamination of food chains (1989-93)	Extra-budgetary	Laboratory	1993
22.	Support for TC projects and individual fellowships	TC		

Table 104

Area of Activity D.6 Food Irradiation

Task	Action or source	Services needed	Year of completion
PROJECT D.6.01: GUIDELINES FOR ACCEPTANCE OF IRRADIATED FOOD IN TRADE			
1.	Publication of proceedings of FAO, IAEA, WHO, ITC UNCTAD/GATT international conference on the acceptance, control of and trade in irradiated foods (1988)		Proceedings, 1989
2.	Four-five manuals and guidelines on specific applications of food irradiation processes	ICGFI	1989/90
3.	Food Irradiation Newsletter (relates also to D.6.02 and D.6.03)		Quarterly
4.	Preparation of public information materials	ICGFI	1989/90
5.	Technical report on harmonizing regulations on food irradiation	CS 89	1990
6.	Training manuals for food control officials and operators of irradiation facilities	ICGFI	1990
7.	Secretariat services to ICGFI (relates also to D.6.02 and D.6.03)	ICGFI	Continuing
PROJECT D.6.02: COMMERCIAL USE OF FOOD IRRADIATION			
8.	Asian regional CRP on food irradiation (RCA) (1986-90)	Extra-budgetary	Laboratory 1990
9.	Latin America regional CRP on food irradiation (ARCAL) (1987-91)		Laboratory 1991
10.	African regional CRP on food irradiation (1988-92)	Extra-budgetary	Laboratory 1992
11.	Europe and Middle East regional CRP on food irradiation (1988-92)		Laboratory 1992
12.	Technical report on the commercial use of food irradiation	ICGFI	1989

Table 104 (Cont.)	Task	Action or source	Services needed	Year of completion
13.	CRP on the development of techniques for determining whether food has been irradiated (1990-94)	Extra-budgetary		1994
14.	Annual training course on food irradiation	IFFIT		Annually
15.	Support for about 25 TC projects and individual fellowships	TC		
PROJECT D.6.03: IRRADIATION FOR INSECT AND PATHOGEN CONTROL				
16.	CRP on irradiation as a quarantine treatment (1985-89)		Laboratory	1989
17.	CRP on use of irradiation to control infectivity of food-borne parasites (1988-92)		Laboratory IFFIT	1992
18.	CRP on use of irradiation in combination with other processes for improving food quality (1989-93)	Extra-budgetary	Laboratory	1993
19.	Support for about 5 TC projects and individual fellowships	TC		

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1989-90

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1989-90, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

<u>1989</u>	<u>Table</u>
1. Advisory Group on ruminant nutrition	101, No. 11
2. Advisory Group on genetic engineering technology for the improvement of the SIT	102, No. 16
<u>1990</u>	
1. Advisory Group on the application of mutations and tracers in modern genetics for plant breeding	100, No. 15

D I V I S I O N O F L I F E S C I E N C E S

ACTIONS PLANNED FOR 1989-90

Table 105Area of Activity E.1 Nuclear Medicine

Task	Action or source	Services needed	Year of completion
PROJECT E.1.01: STRENGTHENING CAPABILITIES FOR IN VITRO ASSAYS			
1. CRP to promote the optimum use of bulk reagents for RIA of thyroid-related hormones (1987-89) (ARCAL)			1989
2. Latin American regional training course on reagent production for RIA (ARCAL)	TC		1989
3. Regional training course on quality control in RIA (RCA)	TC		1989
4. Annual regional training course on RIA (Africa)	TC		1989/90
5. Support for 30-40 TC projects, including 3 regional projects	TC		
PROJECT E.1.02: DIAGNOSIS OF COMMUNICABLE DISEASES			
6. CRP on the diagnosis of tuberculosis (RCA) (1988-90)			1990
7. CRP on the diagnosis of schistosomiasis (1988-90)			1990
8. CRP on radiation immobilization of bioactive substances (1988-90) (also serves objectives of F.1.02)			1990
9. CRP on nuclear techniques for malaria research and control (1988-90)	Extra-budgetary		1990
10. CRP on development of immunoradiometric assay techniques for determination of immune status of individuals at risk to malaria (1988-91)			1991
11. Regional seminar for Latin America on nuclear techniques in parasitic and communicable infections (1989)			Summary report, 1989
12. Support for 2-5 TC projects			
PROJECT E.1.03: THYROID FUNCTION IN ENDEMIC GOITRE AREAS			
13. CRP on nuclear techniques for the investigation of endemic goitre and screening for neonatal hypothyroidism in iodine deficient areas (1988-90)			1990
PROJECT E.1.04: DEVELOPMENT OF INDIGENOUS NUCLEAR MEDICINE RESOURCES			
14. Interregional training course in nuclear medicine	TC		Annually
15. Support for 25-30 TC projects	TC		

Table 105 (cont.)	Task	Action or source	Services needed	Year of completion
PROJECT E.1.05: QUALITY CONTROL AND MAINTENANCE OF NUCLEAR MEDICINE EQUIPMENT				
16.	CRP on development of quality control and maintenance procedures for nuclear medicine instruments (Africa) (1989-91)			1991
17.	Two CRPs on development of quality control and preventive maintenance procedures for gamma cameras, computers and tomographic systems (1989-91) (one for Asia, one for Latin America)			1991
18.	Annual regional training course on quality control and preventive maintenance of nuclear medicine instruments	TC		Annually
19.	CRP on basic care and preventive maintenance of nuclear medicine instruments (RCA) (1988-91)			1991
20.	Internal report on strategies for the provision of spare parts for nuclear medicine instruments	AGM 89/1		1989
21.	Support for 5-10 TC projects, including one regional project	TC		
PROJECT E.1.06: DYNAMIC STUDIES OF ORGAN FUNCTION				
<u>Area of Concentration A: Lung function</u>				
22.	CRP on dynamic studies of lung function (RCA) (1987-90)			1990
<u>Area of Concentration B: Heart and brain function</u>				
23.	CRP on nuclear cardiology (1990-92)	CS 89		1992
24.	Internal report on nuclear investigations of cerebral function	AGM 90/1		1990
PROJECT E.1.07: COST-EFFECTIVENESS OF NUCLEAR AND NON-NUCLEAR PROCEDURES FOR MEDICAL DIAGNOSIS				
<u>Area of Concentration A: Ultrasound and nuclear imaging</u>				
25.	CRP on the comparison of ultrasound and nuclear imaging techniques for the diagnosis of liver disease (RCA) (1988-90)			1990
<u>Area of Concentration B: RIA and enzyme-linked assays</u>				
26.	CRP on the comparison of RIA methods and non-nuclear enzyme-linked assays for the diagnosis of infectious hepatitis (1990-92)	CS 89		1992
PROJECT E.1.08: EARLY DIAGNOSIS OF CANCER BY NUCLEAR MEDICINE METHODS				
27.	CRP on tumour markers (1990-92)	CS 89		1992
28.	Seminar on the application of nuclear techniques in the early diagnosis of cancer in developing countries (1990)			Summary report, 1990

Table 106Area of Activity E.2 Applied Radiation Biology and Radiotherapy

Task	Action or source	Services needed	Year of completion
PROJECT E.2.01: RADIATION STERILIZATION OF MEDICAL SUPPLIES			
1. CRP on tissue graft sterilization and tissue banking (RCA) (1985-90)		Data processing	1990
2. Annual training course on radiation sterilization of tissue grafts (RCA)	TC		Annually
3. CRP on radiation sterilization of local medical supplies (Africa and Middle East) (1989-90)			1990
4. Support for 5-10 TC projects	TC		
PROJECT E.2.02: FERMENTATION PROCESSING OF CASSAVA			
5. CRP on improved fermentation techniques for cassava (jointly with RIFA) (1986-89)		Laboratory	1989
PROJECT E.2.03: RADIOTHERAPY OF CANCER OF THE CERVIX			
6. CRP on computer treatment planning for radiotherapy of carcinoma of the cervix for Asian countries (RCA) (1989-92)	Extra-budgetary		1992
7. Seminar on organization and training in radiotherapy for Africa (1989)			Summary report, 1989
8. Support for 5-10 TC projects	TC		
PROJECT E.2.05: ASSISTANCE IN RADIOTHERAPY PHYSICS AND CLINICAL DOSIMETRY			
9. CRP on adaptation of the relevant radiotherapy factors for improved treatment planning of head and neck tumours under local conditions in developing countries (1990-92)			1992
10. Support for 2-5 TC projects	TC		

Table 107Area of Activity E.3 Dosimetry

Task	Action or source	Services needed	Year of completion
PROJECT E.3.01: SSDL NETWORK			
1. Internal report - Recommendations to the Secretariat on the operation and improvement of the SSDL network	AGM 90/2		1990
2. CRP on the testing of the code of practice on absorbed dose determination in photon and electron beams (1987-89)			1989
3. Development of equipment for SSDLs		Laboratory	Continuing
4. SSDL dosimeter intercomparisons (20 SSDLs per year; therapy, protection, environmental monitoring levels)		Laboratory	Continuing

Table 107 (cont.)	Task	Action or source	Services needed	Year of completion
5.	SSDL Newsletter			Semi-annual
6.	Secondary standard dosimeter calibrations (1-5)	TC	Laboratory	Continuing
7.	On-site training of 5-10 SSDL staff	TC	Laboratory	Continuing
8.	Workshop on dose calibration (Latin America)	TC		1989
9.	Regional seminar on calibration procedures in SSDLs (Latin America) (1989)			Summary report, 1989
10.	Training workshop and seminar on calibration procedures in SSDLs (Africa)	TC		1990
11.	Support for 30-40 TC projects	TC		
<hr/>				
PROJECT E.3.02: DOSE INTERCOMPARISON AND ASSURANCE				
<hr/>				
<u>Area of Concentration A: Radiotherapy</u>				
12.	Dose intercomparisons using TLD (300 hospitals per year)		Laboratory	Continuing
13.	Patient dose intercomparisons using human-shaped phantom		Laboratory	Continuing
14.	Development of equipment and methods for dose intercomparisons		Laboratory	Continuing
<u>Area of Concentration B: Radiation processing</u>				
15.	International dose assurance service (IDAS) (100 dose checks per year, up to 100 participants)	Sub-contract		Continuing
<hr/>				
PROJECT E.3.03: DEVELOPMENT OF DOSIMETRY TECHNIQUES				
<hr/>				
<u>Area of Concentration A: Radiotherapy</u>				
16.	Revision of the technical report on the calibration of dosimeters used in radiotherapy	CS 88 CS 89		1989
17.	CRP on dose intercomparison for high-energy photons and electrons (1988-91)			1991
18.	CRP on performance testing of dosimetry equipment (1988-91)			1991
19.	Regional training course on dosimetry for radiotherapy and radiation protection	TC		1989/90
20.	Regional workshop on photon, electron and neutron dosimetry in radiotherapy (RCA)	TC		1989/90
<u>Area of Concentration B: Radiation processing</u>				
21.	Technical document on dosimetry for quality control of radiation processing	AGM 89/2		1989
22.	CRP on development and intercomparison of high-dose dosimeters (1988-90)			1990
23.	Technical document - Guidelines on commissioning and routine dosimetry for radiation processing facilities	CS 88 CRP 88-90		1990
24.	Symposium on high-dose dosimetry for radiation processing (1990)			Proceedings, 1990
<u>General</u>				
25.	Support for 2-5 TC projects	TC		

Table 108

Area of Activity E.4 Nutritional and Health-Related Environmental Studies

Task	Action or source	Services needed	Year of completion
PROJECT E.4.01: NUCLEAR ANALYTICAL TECHNIQUES IN NUTRITIONAL RESEARCH			
<u>Area of Concentration A: Assessment of dietary intakes of trace elements</u>			
1. Technical report on dietary intakes/recommended dietary allowances for essential minerals and trace elements	CRP 84-90 CS	Laboratory	1990
2. Joint WHO/FAO/IAEA report on trace elements in human nutrition (to be published by WHO)	WHO		1990
<u>Area of Concentration B: Applications of stable isotopes</u>			
3. CRP on assessing the role of stable isotope techniques in human nutrition research (1988-92)		Laboratory	1992
4. Development of certified stable isotope reference materials for use in human nutrition research		Laboratory	1990
<u>Area of Concentration C: Bioavailability of essential micronutrients</u>			
5. CRP on isotope techniques for studying the bioavailability and speciation of essential micronutrients (1990-94)	CS 89		1994
<u>General</u>			
6. Newsletters and bibliographic information service (relates also to E.4.02 and E.4.03)			
7. Support for 2-5 TC projects	TC		
PROJECT E.4.02: NUCLEAR ANALYTICAL TECHNIQUES IN THE MONITORING OF HEALTH-RELATED ENVIRONMENTAL POLLUTION			
8. Co-operation in symposium on nuclear analytical methods in the life sciences (organized by United States' National Bureau of Standards) (1989)			
9. Seminar on nuclear research centres in the service of environmental research (1989)			Summary report, 1989
10. CRP on the use of nuclear and nuclear-related techniques in the study of environmental pollution associated with solid wastes (1987-91)		Laboratory	1991
11. CRP on nuclear techniques for the determination of toxic elements in foodstuffs (1986-90)		Laboratory	1990
12. Training course on sampling, sample preparation and data evaluation in elemental analysis by nuclear methods	TC		1989
13. Training course on the use of nuclear techniques in health-related environmental research and monitoring	TC		1990
14. Technical report on nuclear techniques in air pollution monitoring	AGM 88		1989
15. Technical report on significance of hair analysis as a means for assessing internal body burdens of environmental pollutants	CRP 84-88 CS 89		1989
16. Technical report on environmental specimen banking at nuclear research centres	AGM 90/3		1991
17. Technical documents containing reference analytical methods for selected analytes in environmental materials (2 per year)	CS 89, 90		1989/90
18. Expansion of data base on analytical reference materials for environmental and nutritional studies		Data processing	Continuing
19. Support for 2-5 TC projects	TC		

Table 108 (cont.)	Task	Action or source	Services needed	Year of completion
PROJECT E.4.03: SERVICES TO INTERNATIONAL POLLUTION MONITORING PROGRAMMES				
20.	Validation support for analysis of rainwater and air filter samples from BAPMoN collection centres	CS 89	Laboratory	Continuing
21.	Fellowship training (1-2 trainees annually)	TC	Laboratory	Continuing

Table 109Area of Activity H.3 Environmental Assessment and Protection

Task	Action or source	Services needed	Year of completion
PROJECT H.3.03: MEASUREMENT OF ACCIDENTALLY RELEASED RADIONUCLIDES IN ENVIRONMENTAL AND FOOD SAMPLES			
1.	Addendum to guidebook on monitoring accidentally released radionuclides in environmental and food samples	CRP 88-91 CS 89, 90	Laboratory 1991
2.	Certification of 1-2 new natural-matrix reference materials		Laboratory 1991
3.	Radionuclide measurement services for Member States	TC	Laboratory Continuing
4.	Training courses on the determination of radionuclides in food and environmental samples	TC	Laboratory 1989/90
5.	Fellowship training (1-2 trainees annually)	TC	Laboratory Continuing
6.	Support to 2-5 TC projects	TC	

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1989-90

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1989-90, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

1989Table

- | | | |
|----|--|-------------|
| 1. | Advisory Group on strategies for the provision of spare parts for nuclear medicine instruments | 105, No. 20 |
| 2. | Advisory Group on dosimetry for quality control of radiation processing | 107, No. 21 |

1990Table

- | | | |
|----|--|-------------|
| 1. | Advisory Group on nuclear investigations of cerebral function | 105, No. 24 |
| 2. | Advisory Group - SSDL Scientific Committee | 107, No. 1 |
| 3. | Advisory Group on environmental specimen banking at nuclear research centres | 108, No. 16 |

DIVISION OF PHYSICAL AND CHEMICAL SCIENCES

ACTIONS PLANNED FOR 1989-90

Table 110Area of Activity F.1 Industrial Applications

Task	Action or source	Services needed	Year of completion
PROJECT F.1.02: RADIATION AND ISOTOPE APPLICATIONS IN INDUSTRY			
<u>Area of Concentration A: Development of technology for environmental protection</u>			
1. CRP on chemical processes in optimizing the radiation processing of flue gases (1988-90)			1990
2. CRP on radiation treatment of municipal waste (jointly with RILS) (1988-90)			1990
3. CRP on tracer techniques for prediction of industrial pollutant transport (1989-91)			1991
4. Technical report on the application of nuclear techniques for environmental protection	AGM 90/1		1990
<u>Area of Concentration B: Development of technology for industrial processes</u>			
5. CRP on radiation processing technology for medical and biotechnological applications (1988-90)			1990
6. Technical report on the assessment of the economic benefits of industrial tracer applications	AGM 89/1		1989
7. Technical report on problems in and economic benefits of introducing nucleonic control systems in developing countries	AGM 90/2		1990
8. Technical report on new trends and developments in industrial radiation processing	AGM 90/3		1990
<u>Area of Concentration C: Technology transfer</u>			
9. Technical report on the transfer of radiation technology to developing countries	AGM 89/2		1989
10. Annual training course on radiation technology and engineering and on non-destructive testing	TC		Annually
11. Ten training courses per year on radiation processing, nucleonic control systems and non-destructive testing	TC UNDP/RCA		Annually
12. Support for 60-70 TC projects	TC		

Table 111Area of Activity F.2 Development of Water and Mineral Resources

Task	Action or source	Services needed	Year of completion
PROJECT F.2.02: ISOTOPIC METHODS FOR WATER RESOURCES ASSESSMENT			
<u>Area of Concentration A: Water resources</u>			
1. Technical document on artificial isotopes as tracers in selected hydrological problems	AGM 90/4		1990
2. Technical document on application of isotope methods in studying aquifer vulnerability to pollution	AGM 90/5		1991

Table 111 (Cont.)	Task	Action or source	Services needed	Year of completion
3.	CRP on mathematical models in isotope data evaluation in hydrology (1989-91)		Laboratory, data processing	1991
4.	Technical document on environmental isotopes in precipitation and surface waters	CS 89		1990
<u>Area of Concentration B: Geothermal resources</u>				
5.	Seminar on isotope applications in geothermics in the regions of Asia and the Pacific, Africa and the Middle East (1989)			Summary report, 1990
6.	CRP on isotope and geochemical techniques in geothermal exploration in Latin America (1988-90)	Extra-budgetary	Laboratory	1990
7.	CRP for Asia and the Pacific on the application of isotope techniques in geothermics (1990-93)		Laboratory	1993
<u>General</u>				
8.	Seminar for China on isotope techniques in hydrology and geothermics (1989)			Summary report, 1989
9.	Support for 40-50 TC projects	TC		
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PROJECT F.2.03: ANALYTICAL AND INTERCALIBRATION SERVICES				
<hr/>				
10.	Execution of isotope analyses for TC projects and CRPs in isotope hydrology		Laboratory	Continuing
11.	Refinement of measurement techniques, including construction of equipment		Laboratory	Continuing
12.	Distribution of reference samples (about 200 per year) for intercalibration purposes		Laboratory	Continuing
13.	Technical report - World survey of isotope concentration in precipitation		Laboratory, data processing	1989
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F.2.04: STUDY OF WATER RESOURCES IN AFRICA				
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14.	Regional seminar on the application of isotope techniques in hydrology in African countries (1990), and technical document			Technical document, 1991
15.	Support for 10 TC projects, including two regional projects		Laboratory	
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PROJECT F.2.05: DEVELOPMENT OF MINERAL RESOURCES				
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16.	Symposium on nuclear techniques in the exploration and exploitation of energy and mineral resources (1990)			Proceedings, 1990
17.	CRP on borehole logging techniques for the determination of rock characteristics (1985-89)			1989
18.	Technical report on prompt gamma activation analysis in borehole logging and industrial control	ACM 89/3		1989
19.	CRP on exploration and exploitation of coal, including aspects of on-line and bulk analysis (1989-91)			1991
20.	Support for 5-10 TC projects	TC		

Table 112Area of Activity G.1: Nuclear Measurements and Instrumentation

Task	Action or source	Services needed	Year of completion
PROJECT G.1.01: NUCLEAR INSTRUMENTATION			
1. Internal report on the development of appropriate instrumentation for training and simple applications	CRP 83-88		1990
2. Two interregional and 6-8 regional training courses on nuclear instrumentation annually	TC		Annually
3. Support for 50-60 TC projects	TC		
PROJECT G.1.02: DATA ASSESSMENT AND RESEARCH CO-ORDINATION			
<u>Area of Concentration A: Nuclear data for fission reactor technology</u>			
4. Internal reports - Periodic review of the nuclear data programme by INDC	TCM 89/4 TCM 90/6		1989/90
5. Technical document on a topic to be recommended by the INDC in 1989	AGM 90/7		1991
6. INDC report on the status of fission cross sections and barrier states	CS 90		1991
7. Technical document on the review of transactinium isotope decay data	SPM 89/5		1990
8. INDC report on the review of fission product yields	CRP 88-90 CS 89		1990
9. Technical report on the measurement and analysis of double-differential neutron emission spectra in (p,n) and (alpha,n) reactions	CRP 86-90		1990
<u>Area of Concentration B: Nuclear and atomic data for fusion reactor technology</u>			
10. Internal report - Periodic review of the atomic data programme by the IFRC	TCM 89/6 TCM 90/9		1989/90
11. Data base development: Evaluated Nuclear Data Library for Fusion (FENDL)	SPM 89/7 SPM 90/10	Data processing	1991
12. Technical document on the measurement and calculation of activation cross sections for the generation of long-lived radionuclides	CRP 88-92 CS 89		1992
13. INDC report on 14 MeV neutron-induced double differential neutron emission cross sections	CRP 87-91		1991
14. Technical document on the improvement of atomic and molecular data for fusion edge plasma studies	CRP 88-91 SPM 89/8		1991
15. Technical document on the review of plasma-wall interaction data for fusion	AGM 89/9 CS 90		1991
16. INDC report on atomic and molecular data to evaluate effects of metallic impurities in plasmas	AGM 90/8		1991
17. Data handbooks and data bases: atomic and molecular data for iron and nickel		Data processing	1989/90
18. Data handbook and data base: atomic and molecular data for electrons and protons		Data processing	1989/90
<u>Area of Concentration C: Nuclear and atomic data for applications</u>			
19. Technical document on target and sample properties	AGM 88		1989
20. Technical document on atomic and molecular data for radiotherapy	CRP 88-91 AGM 88		1991

Table 112 (Cont.)	Task	Action or source	Services needed	Year of completion
21.	INDC report on nuclear data needed for neutron therapy	CRP 86-90		1990
22.	Technical report and establishment of data base on gamma-ray standards for detector calibration	CRP 87-89	Data processing	1989
23.	Technical document on the status and requirements of nuclear data for radiation damage	ACM 89/10		1990
24.	Technical report on methods for the calculation of fast neutron nuclear data for structural materials	CRP 86-90		1990
25.	Data handbook and data base: nuclear data for nuclear geophysics		Data processing	1990
26.	Data handbook and data base: nuclear data for radioisotope production		Data processing	1990
27.	Data handbook and data base: nuclear data for safeguards		Data processing	1989
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PROJECT G.1.03: COMPILATION, EVALUATION, EXCHANGE AND VALIDATION OF NUCLEAR DATA				
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<u>Area of Concentration A: Nuclear reaction and structure data</u>				
28.	INDC reports on policy and on technical aspects of nuclear data processing and exchange	CS 89 SPM 90/11		Annually
29.	Technical report - CINDA index to neutron data		Data processing	Annually
30.	Maintenance and development of numerical and bibliographic nuclear reaction data bases		Data processing	Continuing
31.	INDC report on the co-ordination of the nuclear structure and and decay data evaluators network	CS 90		1990
32.	Maintenance and development of numerical nuclear structure and decay data bases		Data processing	Continuing
<u>Area of Concentration B: Atomic and molecular (A + M) data</u>				
33.	INDC report on the technical aspects of A + M data processing and exchange	CS 89		1989
34.	Data index publications: International Bulletin on Atomic and Molecular Data for Fusion		Data processing	Semi-annually
35.	Maintenance and development of bibliographic and numerical A & M data bases for fusion		Data processing	Continuing
<hr/>				
PROJECT G.1.04: DATA CENTRE SERVICES AND TECHNOLOGY TRANSFER				
<hr/>				
<u>Area of Concentration A: Data centre services</u>				
36.	Provision of services: Dissemination of nuclear and atomic data, data processing codes and associated documentation to scientists in Member States		Data processing	Continuing
37.	INDC reports: 70-80 translations and data reports from Member States			Annually
38.	Nuclear Data Newsletter			Semi-annually
<u>Area of Concentration B: Technology transfer to developing countries</u>				
39.	Interregional training course on nuclear measurements and methods in reactor and personnel dosimetry, and publication of lectures	TC		1989
40.	Interregional training course on the preparation of nuclear data for use in reactor calculations, and publication of lectures	TC		1989

RESEARCH AND ISOTOPES

Table 112 (Cont.)	Task	Action or source	Services needed	Year of completion
41.	INDC reports on work done by Member States participating in interregional project (INT/1/039)	TC		1989/90
42.	Support for approximately 10-15 TC projects and in-house training of fellows	TC		
PROJECT G.1.05: NUCLEAR SPECTROSCOPY				
43.	Technical report - Manual on advanced techniques and methods of nuclear spectroscopy	CRP 87-90		1991
44.	Training course on advanced methods of nuclear spectroscopy	TC		1990
45.	Support for 10-15 TC projects	TC		
PROJECT G.1.06: NUCLEAR METHODS IN MATERIALS RESEARCH				
46.	Internal report on contemporary methods of material modification and characterization	CS 89, 90		1990
47.	Support for 10-15 TC projects	TC		

Table 113

Area of Activity G.3 Utilization of Research Reactors and Particle Accelerators

	Task	Action or source	Services needed	Year of completion
PROJECT G.3.01: RESEARCH REACTOR CORE CONVERSION				
1.	Technical document on core conversion at specific reactor types (ARCAL)	CRP 1987-90 Extra-budgetary		1990
2.	Development of small computer software for core conversion calculations	CRP 1988-90		1990
3.	Training course on reactor physics calculations for conversion of research reactors to use of LEU fuels	TC		1989
4.	Support for 5-10 TC projects	TC		
PROJECT G.3.02: UTILIZATION OF RESEARCH REACTORS AND PARTICLE ACCELERATORS				
5.	Technical report on measurement of research reactor fuel burn-up	CS 88		1989
6.	Maintenance of research reactor data base (RRDB)		Data processing	Continuing
7.	Training course on research reactor operations	TC		1990
8.	Support for 30-40 TC projects	TC		

Table 114Area of Activity G.4 Chemistry

Task	Action or source	Services needed	Year of completion
PROJECT G.4.01: RADIOISOTOPE AND RADIOPHARMACEUTICAL PRODUCTION			
1. CRP on radioisotope labelling techniques for monoclonal antibodies (1989-91)	CS 88		1991
2. CRP on alternative technologies for ⁹⁹ Tc ^m generators (1990-93) (RCA)			1993
3. Technical document on modern aspects of radiopharmaceutical research	AGM 89/11		1989
4. Technical document on the role and organization of a centralized radiopharmacy service	CS 90		1990
5. Interregional training course on preparation and control of radiopharmaceuticals	TC		1990
6. Regional training course (Latin America) on preparation and control of radiopharmaceuticals	TC		1989
7. Support for 20-30 TC projects	TC		
PROJECT G.4.02: NUCLEAR ANALYTICAL CHEMISTRY			
8. CRP on nuclear analytical techniques for trace element analysis in agro-industrial products (1988-90) (ARCAL)			1990
9. CRP on new radiochemical separation techniques for trace element analysis (1988-90)			1990
10. Four analytical quality control intercomparisons per year		Laboratory	Annually
11. Preparation and distribution of 30-50 reference materials per year		Laboratory	Annually
12. Training course on nuclear analytical techniques	TC		1989
13. Support for 20-30 TC projects	TC	Laboratory	

Table 115Area of Activity A.3 Nuclear Power Systems Technologies

Task	Action or source	Services needed	Year of completion
PROJECT A.3.05: FUSION RESEARCH AND ENGINEERING			
1. Conference on plasma physics and controlled nuclear fusion research (1990)			Proceedings, 1990
2. Technical document on research using small tokamaks	TCM 88		1989
3. Technical document on impurity control	TCM 89/12		1989
4. Technical document on electron cyclotron emissions	TCM 89/13		1989

RESEARCH AND ISOTOPES

Table 115 (Cont.)	Task	Action or source	Services needed	Year of completion
5.	Technical document on inertial confinement fusion	TCM 89/14		1990
6.	Technical report on the status of fusion	TCM 89/15		1989
7.	Technical documents (two) on research using small tokamaks	TCM 89/16 TCM 90/12		1989
8.	Summary report on H mode confinement	TCM 89/17		1989
9.	Technical document on stellarators	TCM 89/18		1989
10.	Technical document on the impact (spin-offs) of fusion research and development on areas other than power generation	TCM 89/19		1989
11.	CRP on advanced diagnostics for edge plasma studies (1987-90)			1990

PROJECT A.3.06: INTERNATIONAL THERMONUCLEAR EXPERIMENTAL REACTOR (ITER)

12.	Technical document on the definition phase of the ITER conceptual design study	TCM 89/20		1989
13.	Technical report on the ITER conceptual design study	TCM 90/13		1990
14.	Technical documents on technical aspects of the ITER study (topics to be identified)	TCM 89/21 TCM 90/14		1989/90

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1989-90

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1989-90, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

1989

Table

- | | | |
|----|---|-------------|
| 1. | Advisory Group on assessment of economic benefits of industrial tracer applications | 110, No. 6 |
| 2. | Advisory Group on transfer of radiation technology to developing countries | 110, No. 9 |
| 3. | Advisory Group on prompt gamma activation analysis in borehole logging and industrial control | 111, No. 18 |
| 4. | Technical Committee - Seventeenth Meeting of the International Nuclear Data Committee | 112, No. 4 |
| 5. | Specialists' Meeting on status and requirements of transactinium isotope decay data | 112, No. 7 |
| 6. | Technical Committee - Fifth Meeting of the IFRC Subcommittee on A + M Data for Fusion | 112, No. 10 |

<u>1989</u>	<u>Table</u>
7. Specialists' Meeting on fusion benchmark measurements and integral testing of the FENDL library	112, No. 11
8. Specialists' Meeting on review of the status of A + M data for fusion edge plasma studies	112, No. 14
9. Advisory Group on plasma-wall interaction data for fusion	112, No. 15
10. Advisory Group on status and requirements of nuclear data for radiation damage	112, No. 23
11. Advisory Group on modern aspects of radiopharmaceutical research	114, No. 3
12. Technical Committee on impurity control	115, No. 3
13. Technical Committee on electron cyclotron emissions	115, No. 4
14. Technical Committee on inertial confinement fusion	115, No. 5
15. Technical Committee - International Fusion Research Council meeting on the status of fusion	115, No. 6
16. Technical Committee on research using small tokamaks	115, No. 7
17. Technical Committee on H mode confinement	115, No. 8
18. Technical Committee on stellarators	115, No. 9
19. Technical Committee on the impact (spin-offs) of fusion research and development on areas other than power generation	115, No. 10
20. Technical Committee on definition phase of the ITER conceptual design study	115, No. 12
21. Technical Committees on aspects of the ITER study	115, No. 14

<u>1990</u>	<u>Table</u>
1. Advisory Group on the application of nuclear techniques for environmental protection	110, No. 4
2. Advisory Group on introduction of nucleonic control systems in developing countries	110, No. 7
3. Advisory Group on new trends and developments in industrial radiation processing	110, No. 8
4. Advisory Group on artificial isotopes as tracers in selected hydrological problems	111, No. 1

<u>1990</u>	<u>Table</u>
5. Advisory Group on application of isotope methods in studying aquifer vulnerability to pollution	111, No. 2
6. Technical Committee - Eighteenth meeting of the International Nuclear Data Committee	112, No. 4
7. Advisory Group on topic on nuclear data to be recommended by INDC	112, No. 5
8. Advisory Group on A + M data for metallic impurities in plasmas	112, No. 16
9. Technical Committee - Sixth meeting of the IFRC Subcommittee on A + M Data for Fusion	112, No. 10
10. Specialists' Meeting on results of FENDL-1 testing and start of FENDL-2	112, No. 11
11. Specialists' Meeting on technical aspects of nuclear data processing and exchange	112, No. 28
12. Technical Committee on research using small tokamaks	115, No. 7
13. Technical Committee on ITER conceptual design study	115, No. 13
14. Technical Committees on technical aspects of the ITER study (topics to be identified)	115, No. 14

Table 116

The role of the Agency's Laboratory in
Programmes D, E, F and G

Programme	Services provided
D. <u>Food and Agriculture</u>	<p>Training will be provided for individual fellows (166 man-months for 45 fellows in 1987) and about four training courses will be organized and hosted. Back-up research will be conducted in various areas where the Laboratory possesses specific expertise (for example, insect mass rearing systems and artificial diets). Other services provided will include isotopic analysis in connection with CRPs, the distribution of labelled fertilizers and pesticides and the provision of standardized reagents and RIA kits.</p>
E. <u>Human Health</u>	<p>The Dosimetry Laboratory serves as the co-ordinating laboratory for the IAEA/WHO Network of SSDLs. It will provide training, calibrate dosimeters and develop special equipment for use in SSDLs. Dose intercomparisons will be performed for 300 radiotherapy hospitals and 25 SSDLs each year.</p> <p>Support for CRPs will principally be in the form of analytical services.</p> <p>Validation support will be provided for the analysis of rainwater and air filter samples under the BAPMoN project and analytical methods will be developed for air pollution monitoring.</p>
F. <u>Industry and Earth Sciences</u>	<p>In the development of water and mineral resources, laboratory activities will focus on providing analytical services (^3H, ^2H, ^{18}O, ^{13}C, ^{14}C) for national institutes lacking analytical facilities. Reference samples will be prepared, calibrated and distributed to Member States.</p>
G. <u>Physical and Chemical Sciences</u>	<p>In instrument-related activities, prototypes for the IAEA-Eurocard Kit System will be tested and, if necessary, modified.</p> <p>In chemistry, training will be provided for individual fellows. Four analytical quality control intercomparisons will be organized and 30-50 reference materials prepared and distributed each year.</p>

[*] The work done by the Laboratory in connection with specific tasks has been referred to in Tables 99-115. For easy reference, the main forms of the Laboratory's contribution to the programmes indicated are summarized in this table.

APPROPRIATION SECTION 4

OPERATIONAL FACILITIES

APPROPRIATION SECTION 4: OPERATIONAL FACILITIES

Summary of cost

Table 117

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Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	426 275	507 000	(8 000)	(1.6)	499 000	-	-	499 000	2.4	511 000	5.1	537 000
Salaries - established posts - GS & M&O	391 756	436 000	-	-	436 000	-	-	436 000	10.6	482 000	3.9	501 000
Temporary assistance - GS & M&O	37 729	14 900	(14 900)	(100.0)	-	-	-	-	-	-	-	-
Common staff costs	284 081	313 900	(900)	(0.3)	313 000	-	-	313 000	8.0	337 900	4.3	352 700
Sub-total: Staff costs	1 139 841	1 271 800	(23 800)	(1.9)	1 248 000	-	-	1 248 000	6.6	1 330 900	4.5	1 390 700
Travel	29 256	44 000	6 000	13.6	50 000	(10 000)	(20.0)	40 000	1.0	50 500	1.0	40 800
Representation and hospitality	943	2 800	(800)	(28.6)	2 000	-	-	2 000	-	2 000	5.0	2 100
Training	395	3 400	(400)	(11.8)	3 000	-	-	3 000	-	3 000	6.7	3 200
Experts	6 553	13 500	(500)	(3.7)	13 000	-	-	13 000	0.8	13 100	1.5	13 300
Equipment: leased or rented	1 379	-	1 000	-	1 000	-	-	1 000	-	1 000	-	1 000
Equipment: purchased (construction)	205 026	146 400	(9 400)	(6.4)	137 000	(3 000)	(2.2)	134 000	2.9	141 000	3.0	142 000
Supplies and materials	133 604	78 500	31 500	40.1	110 000	-	-	110 000	3.0	113 300	3.0	116 700
General operating expenses	58 680	40 400	9 600	23.8	50 000	-	-	50 000	3.6	51 800	3.5	53 600
Contracts	1 778	3 000	-	-	3 000	-	-	3 000	-	3 000	-	3 000
Research and technical contracts	24 700	52 000	(10 000)	(19.2)	42 000	-	-	42 000	2.4	43 000	2.3	44 000
Miscellaneous	1 042 515	1 159 200	(1 200)	(0.1)	1 158 000	-	-	1 158 000	5.0	1 215 400	4.9	1 275 600
Sub-total: Other direct costs	1 504 829	1 543 200	25 800	1.7	1 569 000	(13 000)	(0.8)	1 556 000	4.3	1 637 100	4.5	1 695 300
Translation and records services	-	1 000	-	-	1 000	-	-	1 000	-	1 000	-	1 000
Printing and publishing services	55 873	109 000	(52 000)	(47.7)	57 000	3 000	5.3	60 000	7.0	61 000	4.4	67 000
Data processing services	33 800	29 000	(22 000)	(75.9)	7 000	-	-	7 000	-	7 000	14.3	8 000
Contract administration	3 632	4 000	-	-	4 000	-	-	4 000	-	4 000	-	4 000
Charged to ICTP	141 600	-	-	-	-	-	-	-	-	-	-	-
Sub-total: Shared costs	234 905	143 000	(74 000)	(51.7)	69 000	3 000	4.3	72 000	5.8	73 000	5.0	80 000
T O T A L	2 879 575	2 958 000	(72 000)	(2.4)	2 886 000	(10 000)	(0.3)	2 876 000	5.4	3 041 000	4.4	3 166 000

APPROPRIATION SECTION 4: OPERATIONAL FACILITIES

Expenditure by Division

Table 118

Division	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %	1989 at 1988 prices	Expenditure increase(decrease) %	1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
International Centre for Theoretical Physics	1 245 488	1 262 000	(61 000) (4.8) ^{a/}	1 201 000	- -	1 201 000	5.1	1 262 000	5.0	1 325 000
International Laboratory of Marine Radioactivity	1 634 087	1 696 000	(11 000) (0.6)	1 685 000	(10 000) (0.6)	1 675 000	5.6	1 779 000	4.1	1 841 000
Total Appropriation Section	2 879 575	2 958 000	(72 000) (2.4)	2 886 000	(10 000) (0.3)	2 876 000	5.4	3 041 000	4.4	3 166 000

a/ The expenditure decrease in ICTP reflects an adjustment in charges for services rendered to the ICTP. There is no decrease in real terms in resources available to the programme.

Manpower by Division

Table 119

Division	1988 Adjusted				1989			
	P	GS	M&O	Total	P	GS	M&O	Total
International Laboratory of Marine Radioactivity	9	16	-	25	9	16	-	25
International Centre for Theoretical Physics	11	25	-	36	11	25	-	36
Total Appropriation Section	20	41	-	61	20	41	-	61

OPERATIONAL FACILITIES

INTERNATIONAL LABORATORY OF MARINE RADIOACTIVITY

ACTIONS PLANNED FOR 1989-90

Table 120

Task	Action or source	Services needed	Year of completion
PROJECT C.2.05: SUPPORT FOR MARINE RADIOACTIVE MONITORING			
1. Analytical quality assurance service for radionuclide measurements in marine materials (2 worldwide intercalibration exercises per year and reports)	CS	Seibersdorf Laboratory	Continuing
2. Development and evaluation of alternative radioanalytical methods, including mass spectrometry for marine materials	AGM 89/1		1990
3. Assessment of inventories and monitoring of radionuclides in the world's oceans	CS		Technical document, 1990
4. In-service training in radionuclide measurements and radio-tracer experiments in marine food chains (2 fellowships per year)	TC		Continuing
PROJECT C.2.06: RESEARCH ON RADIONUCLIDES IN THE MARINE ENVIRONMENT			
5. CRP on the comparative behaviour of radionuclides from fallout and accidental and controlled releases to the marine environment (1989-92)			1992
6. Report on the assessment of radionuclide transfer and transport through the marine food chain leading to man	CS 90		Continuing
7. Global measurements of vertical flux of radionuclides within the framework of international collaborative programmes	UN agencies/ Member States		Continuing
PROJECT E.4.03: SERVICES TO INTERNATIONAL POLLUTION MONITORING PROGRAMMES			
8. Quality assurance assistance to Member State institutions world wide (intercalibration, co-operative monitoring)		Seibersdorf Laboratory	Continuing
9. Development, testing and revision of reference methods and guidelines for marine pollutant measurement	UNEP CS		Continuing
10. In-service training in the analysis of marine pollutants (approximately 20 trainees)	UN agencies		Continuing
11. Instrument maintenance services (including annual operator training course)	UNEP		Continuing
12. Assisting Member States to obtain information on the transport, fate and effects of marine pollutants	TC CS		Continuing

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1989-90

1989

Table

1. Advisory Group on the development and evaluation of alternative radioanalytical methods, including mass spectrometry for marine materials

120, No. 2

APPROPRIATION SECTION 5

SAFEGUARDS

APPROPRIATION SECTION 5: SAFEGUARDS

Summary of cost

Table 121

Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	15 838 789	18 569 000	450 000	2.4	19 019 000	1 627 000	8.6	20 646 000	2.5	19 495 000	5.0	22 222 000
Temporary assistance - P	344 261	238 400	(61 400)	(25.8)	177 000	(102 000)	(57.6)	75 000	1.5	179 600	4.0	79 200
Salaries - established posts - GS & M&O	4 658 026	5 049 000	96 000	1.9	5 145 000	84 000	1.6	5 229 000	10.5	5 685 000	4.0	6 009 000
Temporary assistance - GS & M&O	169 702	255 600	(246 600)	(96.5)	9 000	-	-	9 000	8.9	9 800	3.1	10 100
Common staff costs	6 819 565	7 908 700	249 300	3.2	8 158 000	538 000	6.6	8 696 000	5.7	8 625 600	4.8	9 630 200
Overtime	5 341	12 600	(3 600)	(28.6)	9 000	-	-	9 000	10.0	9 900	1.0	10 000
Sub-total: Staff costs	27 835 684	32 033 300	483 700	1.5	32 517 000	2 147 000	6.6	34 664 000	4.6	34 004 900	4.7	37 960 500
Travel	5 183 427	4 847 300	509 700	10.5	5 357 000	274 000	5.1	5 631 000	1.0	5 410 600	1.0	5 744 200
Representation and hospitality	16 162	24 500	(3 500)	(14.3)	21 000	6 000	28.6	27 000	1.9	21 400	1.4	27 900
Training	31 828	10 300	211 700	2 055.3	222 000	(200 000)	(90.1)	22 000	1.0	224 200	4.0	23 100
Experts	7 893	215 200	86 800	40.3	302 000	15 000	5.0	317 000	1.0	305 100	1.0	323 400
Equipment: leased or rented	128 231	221 200	87 800	39.7	309 000	-	-	309 000	1.0	312 000	0.9	315 000
Equipment: purchased (construction)	2 887 567	3 440 200	(58 200)	(1.7)	3 382 000	(60 000)	(1.8)	3 322 000	1.0	3 416 000	1.0	3 388 000
Supplies and materials	1 140 079	1 592 500	(242 500)	(15.2)	1 350 000	4 000	0.3	1 354 000	1.0	1 363 500	1.0	1 381 100
General operating expenses	884 477	922 100	193 900	21.0	1 116 000	22 000	2.0	1 138 000	3.5	1 155 100	3.5	1 219 000
Contracts	927 923	842 000	98 000	11.6	940 000	-	-	940 000	1.1	950 000	0.9	959 000
Research and technical contracts	58 005	73 000	17 000	23.3	90 000	-	-	90 000	3.3	93 000	2.2	95 000
Miscellaneous	298 644	299 400	10 600	3.5	310 000	9 000	2.9	319 000	2.0	316 200	2.0	331 800
Sub-total: Other direct costs	11 564 236	12 487 700	911 300	7.3	13 399 000	70 000	0.5	13 469 000	1.3	13 567 100	1.2	13 807 500
Conference services	24 435	9 000	7 000	77.8	16 000	8 000	50.0	24 000	6.3	17 000	5.8	27 000
Interpretation services	27 191	18 000	(18 000)	(100.0)	-	36 000	-	36 000	-	-	5.6	38 000
Translation and records services	260 599	254 000	-	-	254 000	-	-	254 000	4.7	266 000	4.5	278 000
Printing and publishing services	128 867	68 000	(35 000)	(51.5)	33 000	27 000	81.8	60 000	6.1	35 000	6.8	68 000
Data processing services	1 629 645	1 723 000	118 000	6.8	1 841 000	(18 000)	(1.0)	1 823 000	4.6	1 926 000	3.7	1 978 000
Contract administration	22 757	28 000	-	-	28 000	-	-	28 000	3.6	29 000	6.9	31 000
Laboratory services	1 957 066	2 180 000	-	-	2 180 000	-	-	2 180 000	6.2	2 315 000	4.2	2 413 000
Radiation protection and legal services	342 200	692 000	34 000	4.9	726 000	34 000	4.7	760 000	5.0	762 000	4.1	831 000
Sub-total: Shared costs	4 392 760	4 972 000	106 000	2.1	5 078 000	87 000	1.7	5 165 000	5.4	5 350 000	4.0	5 664 000
T O T A L	43 792 680	49 493 000	1 501 000	3.0	50 994 000	2 304 000	4.5	53 298 000	3.8	52 922 000	3.8	57 432 000

APPROPRIATION SECTION 5: SAFEGUARDS

Expenditure by Division

Table 122

Division	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Programme Co-ordination	379 972	434 000	(11 000)	(2.5)	423 000	(136 000)	(32.2)	287 000	3.8	439 000	4.7	312 000
Operations A	8 624 716	9 310 000	509 000	5.5	9 819 000	1 168 000	11.9	10 987 000	3.4	10 153 000	3.9	11 805 000
Operations B	6 692 099	7 387 000	231 000	3.1	7 618 000	900 000	11.8	8 518 000	3.6	7 893 000	4.1	9 190 000
Operations C	7 118 645	8 316 000	119 000	1.4	8 435 000	423 000	5.0	8 858 000	3.8	8 756 000	4.3	9 587 000
Development and Technical Support	10 426 324	12 266 000	(29 000)	(0.2)	12 237 000	84 000	0.7	12 321 000	3.4	12 657 000	3.1	13 131 000
Safeguards Information Treatment	6 110 181	6 794 000	424 000	6.2	7 218 000	69 000	1.0	7 287 000	4.7	7 556 000	3.8	7 920 000
Safeguards Evaluation	2 349 165	2 689 000	42 000	1.6	2 731 000	(15 000)	(0.5)	2 716 000	4.3	2 849 000	4.6	2 963 000
Standardization, Training and Administrative Support	2 091 578	2 297 000	216 000	9.4	2 513 000	(189 000)	(7.5)	2 324 000	4.2	2 619 000	4.2	2 524 000
Total Appropriation Section	43 792 680	49 493 000	1 501 000	3.0	50 994 000	2 304 000	4.5	53 298 000	3.8	52 922 000	3.8	57 432 000

SAFEGUARDS

APPROPRIATION SECTION 5: SAFEGUARDS

Manpower by DivisionTable 123

Division	1988 Adjusted				1989			
	P	GS	M&O	Total	P	GS	M&O	Total
Programme Co-ordination	1	2	-	3	1	2	-	3
Operations A	67	30	-	97	74	31	-	105
Operations B	51	28	-	79	57	30	-	87
Operations C	64	37	-	101	65	37	-	102
Development and Technical support	33	33	-	66	33	34	-	67
Safeguards Information Treatment	27	40	-	67	29	40	-	69
Safeguards Evaluation	22	15	-	37	22	15	-	37
Standardization, Training and Administrative Support	12	14	-	26	12	14	-	26
Total Appropriation Section	277	199	-	476	293	203	-	496

Department of Safeguards

In the previous two budget cycles, the Department of Safeguards listed tasks in the same format as that used by the technical Departments of the Agency. In the 1985-86 budget cycle all tasks were described, but only in a very general manner so as to keep the volume of data comparable with that of other Departments. In 1987-88 a more detailed approach was used, but only those tasks of a project-oriented nature were included. In practice these approaches have not proved successful as a means of controlling programme implementation, nor have they provided Member States with information beyond that recorded in the safeguards implementation reports, which constitute a comprehensive statement of the many actions being undertaken. In the meantime the Department of Safeguards has developed a format for its annual work plan which contains a brief description of more than 100 tasks and identifies the officer responsible and the start and completion dates (month/year) of the tasks. This work plan is used by the management of the Department for monitoring programme implementation. It has therefore been decided not to include tables of actions planned for this Department. However, the lists of detailed tasks set out in the Department's work plan will be made available to any interested Member State upon request.

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1989-90

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1989-90, it is planned to hold the meetings listed below.

1989

1. Standing Advisory Group on Safeguards Implementation (SAGSI)
(two meetings)
2. Advisory Group on NDA standards for safeguards purposes
3. Advisory Group on multiple-facility nuclear fuel cycles

1990

1. Standing Advisory Group on Safeguards Implementation (SAGSI)
(two meetings)
2. Advisory Group to review techniques for optical surveillance
3. Advisory Group on the application of safeguards at reprocessing plants

APPROPRIATION SECTION 6

POLICY-MAKING ORGANS

APPROPRIATION SECTION 6: POLICY-MAKING ORGANS

Summary of costTable 124

Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	202 296	249 000	-	-	249 000	-	-	249 000	2.4	255 000	5.1	268 000
Salaries - established posts - GS & M&O	76 438	55 000	22 000	40.0	77 000	-	-	77 000	10.4	85 000	3.5	88 000
Temporary assistance - GS & M&O	26 462	20 700	6 300	30.4	27 000	-	-	27 000	9.3	29 500	2.7	30 300
Common staff costs	92 689	106 200	11 800	11.1	118 000	-	-	118 000	6.1	125 200	4.9	131 300
Overtime	46 639	50 500	1 500	3.0	52 000	-	-	52 000	9.0	56 700	3.0	58 400
Sub-total: Staff costs	444 524	481 400	41 600	8.6	523 000	-	-	523 000	5.4	551 400	4.5	576 000
Travel	135 278	6 400	93 600	1 462.5	100 000	-	-	100 000	1.1	101 100	0.9	102 000
Representation and hospitality	12 944	11 500	4 500	39.1	16 000	-	-	16 000	1.9	16 300	1.8	16 600
Equipment: leased or rented	12 396	-	27 000	-	27 000	-	-	27 000	-	27 000	3.7	28 000
Equipment: purchased (construction)	21 312	-	-	-	-	-	-	-	-	-	-	-
Supplies and materials	11 481	4 100	6 900	168.3	11 000	-	-	11 000	0.9	11 100	0.9	11 200
General operating expenses	41 018	70 800	(26 800)	(37.9)	44 000	-	-	44 000	3.6	45 600	3.5	47 200
Contracts	5 881	4 000	-	-	4 000	-	-	4 000	-	4 000	-	4 000
Miscellaneous	3 296	134 800	(108 800)	(80.7)	26 000	-	-	26 000	1.9	26 500	1.9	27 000
Sub-total: Other direct costs	243 606	231 600	(3 600)	(1.6)	228 000	-	-	228 000	1.6	231 600	1.9	236 000
Conference services	242 079	257 000	-	-	257 000	-	-	257 000	6.6	274 000	4.8	287 000
Interpretation services	333 801	452 000	(43 000)	(9.5)	409 000	-	-	409 000	2.4	419 000	4.3	437 000
Translation and records services	3 361 935	3 819 000	(69 000)	(1.8)	3 750 000	-	-	3 750 000	4.7	3 925 000	4.4	4 099 000
Printing and publishing services	371 614	474 000	63 000	13.3	537 000	-	-	537 000	7.4	577 000	3.9	599 000
Data processing services	5 900	10 000	11 000	110.0	21 000	-	-	21 000	4.8	22 000	4.5	23 000
Sub-total: Shared costs	4 315 329	5 012 000	(38 000)	(0.8)	4 974 000	-	-	4 974 000	4.9	5 217 000	4.4	5 445 000
T O T A L	5 003 459	5 725 000	-	-	5 725 000	-	-	5 725 000	4.8	6 000 000	4.3	6 257 000

APPROPRIATION SECTION 6: POLICY-MAKING ORGANS

Expenditure

Table 125

	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
The General Conference	2 082 856	2 293 000	22 000	1.0	2 315 000	-	-	2 315 000	4.7	2 424 000	4.2	2 525 000
The Board of Governors	2 920 603	3 432 000	(22 000)	(0.6)	3 410 000	-	-	3 410 000	4.9	3 576 000	4.3	3 732 000
Total Appropriation Section	5 003 459	5 725 000	-	-	5 725 000	-	-	5 725 000	4.8	6 000 000	4.3	6 257 000

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Summary of manpower

Table 126

	1988 Adjusted				1989			
	P	GS	M&O	Total	P	GS	M&O	Total
Policy-making Organs	3	3	-	6	3	3	-	6

POLICY-MAKING ORGANS

APPROPRIATION SECTION 7

EXECUTIVE MANAGEMENT AND ADMINISTRATION

APPROPRIATION SECTION 7: EXECUTIVE MANAGEMENT AND ADMINISTRATION

Summary of costTable 127

Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	4 259 239	5 178 000	20 000	0.4	5 198 000	(25 000)	(0.5)	5 173 000	2.5	5 329 000	5.0	5 567 000
Temporary assistance - P	176 949	35 900	60 000	167.1	95 900	-	-	95 900	1.5	97 300	4.0	101 200
Salaries - established posts - GS & M&O	3 134 780	3 216 000	28 000	0.9	3 244 000	-	-	3 244 000	10.5	3 586 000	4.0	3 729 000
Temporary assistance - GS & M&O	247 519	89 900	32 100	35.7	122 000	-	-	122 000	9.0	133 000	3.0	137 000
Common staff costs	2 550 967	2 797 700	102 600	3.7	2 900 300	(8 800)	(0.3)	2 891 500	7.2	3 110 100	4.6	3 242 300
Overtime	54 828	45 400	(3 300)	(7.3)	42 100	-	-	42 100	9.0	45 900	2.6	47 100
Sub-total: Staff costs	10 424 282	11 362 900	239 400	2.1	11 602 300	(33 800)	(0.3)	11 568 500	6.0	12 301 300	4.6	12 823 600
Travel	373 511	434 100	(23 500)	(5.4)	410 600	(9 700)	(2.4)	400 900	1.0	414 800	1.0	408 800
Representation and hospitality	34 920	51 000	(2 500)	(4.9)	48 500	-	-	48 500	0.8	48 900	0.8	49 300
Training	373 047	472 200	(306 000)	(64.8)	166 200	-	-	166 200	1.0	167 900	4.1	174 700
Experts	18 814	54 500	66 200	121.5	120 700	20 000	16.6	140 700	1.0	121 900	1.1	143 600
Equipment: leased or rented	47 954	62 000	(33 500)	(54.0)	28 500	(5 000)	(17.5)	23 500	1.8	29 000	0.3	24 000
Equipment: purchased (construction)	151 106	120 700	(10 400)	(8.6)	110 300	49 000	44.4	159 300	1.5	112 000	0.8	163 000
Supplies and materials	80 346	48 600	11 000	22.6	59 600	9 700	16.3	69 300	0.8	60 100	1.2	70 700
General operating expenses	189 945	277 600	(32 400)	(11.7)	245 200	20 800	8.5	266 000	3.5	253 700	3.5	285 000
Contracts	1 916	5 000	-	-	5 000	-	-	5 000	-	5 000	-	5 000
Miscellaneous	378 650	463 400	(153 300)	(33.1)	310 100	18 000	5.8	328 100	2.0	316 400	2.0	341 300
Sub-total: Other direct costs	1 650 209	1 989 100	(484 400)	(24.4)	1 504 700	102 800	6.8	1 607 500	1.7	1 529 700	1.9	1 665 400
Conference services	3 360	1 000	-	-	1 000	-	-	1 000	-	1 000	-	1 000
Interpretation services	32 628	48 000	(17 000)	(35.4)	31 000	1 000	3.2	32 000	3.2	32 000	3.0	34 000
Translation and records services	680 261	741 000	(81 000)	(10.9)	660 000	(40 000)	(6.1)	620 000	4.7	691 000	4.3	677 000
Printing and publishing services	563 954	568 000	74 000	13.0	642 000	(17 000)	(2.6)	625 000	7.0	687 000	4.4	698 000
Data processing services	904 000	907 000	36 000	4.0	943 000	(13 000)	(1.4)	930 000	4.7	987 000	3.6	1 009 000
Other services a/	(4 301)	185 000	-	-	185 000	-	-	185 000	11.4	206 000	2.4	211 000
Sub-total: Shared costs	2 179 902	2 450 000	12 000	0.5	2 462 000	(69 000)	(2.8)	2 393 000	5.8	2 604 000	3.9	2 630 000
T O T A L	14 254 393	15 802 000	(233 000)	(1.5)	15 569 000	-	-	15 569 000	5.6	16 435 000	4.1	17 119 000

a/ Includes Medical Services less charges for Legal Services which are transferred to Safeguards.

APPROPRIATION SECTION 7: EXECUTIVE MANAGEMENT AND ADMINISTRATION

Expenditure

Table 128

	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Executive Management	2 256 600	2 674 000	(107 000)	(4.0)	2 567 000	-	-	2 567 000	4.5	2 682 000	4.2	2 794 000
Administration	11 997 793	13 128 000	(126 000)	(1.0)	13 002 000	-	-	13 002 000	5.8	13 753 000	4.1	14 325 000
Total Appropriation Section	14 254 393	15 802 000	(233 000)	(1.5)	15 569 000	-	-	15 569 000	5.6	16 435 000	4.1	17 119 000

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Manpower

Table 129

	1988 Adjusted				1989			
	P	GS	M&O	Total	P	GS	M&O	Total
Executive management	14	12	-	26	14	12	-	26
Administration	62	102	-	164	62	102	-	164
Total Appropriation Section	76	114	-	190	76	114	-	190

EXECUTIVE MANAGEMENT AND ADMINISTRATION

APPROPRIATION SECTION 8

GENERAL SERVICES

APPROPRIATION SECTION 8: GENERAL SERVICES

Summary of cost

Table 130

Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	564 151	659 000	(2 000)	(0.3)	657 000	-	-	657 000	2.4	673 000	5.1	707 000
Salaries - established posts - GS & M&O	2 386 240	2 481 000	(35 000)	(1.4)	2 446 000	-	-	2 446 000	10.5	2 703 000	4.0	2 811 000
Temporary assistance - GS & M&O	54 210	34 200	(18 200)	(53.2)	16 000	-	-	16 000	8.8	17 400	3.4	18 000
Common staff costs	988 449	1 040 900	4 200	0.4	1 045 100	-	-	1 045 100	10.4	1 153 800	4.2	1 201 900
Overtime	21 704	36 900	-	-	36 900	-	-	36 900	8.9	40 200	3.0	41 400
Sub-total: Staff costs	4 014 754	4 252 000	(51 000)	(1.2)	4 201 000	-	-	4 201 000	9.2	4 587 400	4.2	4 779 300
Travel	6 246	7 100	300	4.2	7 400	-	-	7 400	1.4	7 500	-	7 500
Representation and hospitality	403	600	-	-	600	-	-	600	-	600	-	600
Equipment: leased or rented	6 957	-	-	-	-	-	-	-	-	-	-	-
Equipment: purchased (construction)	255 597	283 500	(10 500)	(3.7)	273 000	-	-	273 000	2.6	280 000	2.5	287 000
Supplies and materials	867 468	825 300	44 700	5.4	870 000	-	-	870 000	2.0	887 400	2.0	905 200
General operating expenses	9 964 644	10 448 500	(86 500)	(0.8)	10 362 000	-	-	10 362 000	3.5	10 724 800	3.5	11 099 800
Miscellaneous	115 210	-	115 000	-	115 000	-	-	115 000	2.0	117 300	2.0	119 600
Sub-total: Other direct costs	11 216 525	11 565 000	63 000	0.5	11 628 000	-	-	11 628 000	3.4	12 017 600	3.3	12 419 700
Translation and records services	3 716	4 000	-	-	4 000	-	-	4 000	-	4 000	-	4 000
Printing and publishing services	64 011	69 000	-	-	69 000	-	-	69 000	7.2	74 000	4.1	77 000
Data processing services	117 900	122 000	(12 000)	(9.8)	110 000	-	-	110 000	4.5	115 000	3.5	119 000
Sub-total: Shared costs	185 627	195 000	(12 000)	(6.2)	183 000	-	-	183 000	5.5	193 000	3.6	200 000
T O T A L	15 416 906	16 012 000	-	-	16 012 000	-	-	16 012 000	4.9	16 798 000	3.6	17 399 000

APPROPRIATION SECTION 8: GENERAL SERVICES

Summary of manpower

Table 131

	1988 Adjusted				1989			
	P	GS	M&O	Total	P	GS	M&O	Total
General Services	10	71	28	109	10	71	28	109

GENERAL SERVICES

VIC Operating Costs

Table 132

	1987 Actual expenditures	1988 Adjusted Budget	1989 Estimate	1990 Estimate
Utilities	2 802 926	2 860 000	2 965 000	3 069 000
Contractual maintenance services	967 995	1 313 500	1 364 000	1 412 000
Cleaning	1 112 228	1 045 000	1 053 600	1 091 000
Building and maintenance staff	1 921 044	1 872 000	1 932 000	1 999 000
Security services staff costs	1 247 861	1 312 000	1 422 000	1 471 000
Building and maintenance supplies	369 540	402 000	428 400	437 000
Building, property and maintenance equipment	101 280	78 500	84 000	86 000
Sinking Fund, major repairs	65 000	72 000	73 000	75 000
TOTAL	8 587 874	8 955 000	9 322 000	9 640 000

Costs of common services, supplies and equipmentTable 133

	1987 Actual expenditures	1988 Adjusted Budget	1989 Estimate	1990 Estimate
Division of General Services				
A. Services:				
Communications	1 282 658	1 235 000	1 263 000	1 307 000
Freight and Transportation	41 591	46 000	45 700	47 800
Rental of Premises	66 372	95 000	93 000	96 000
Rental and maintenance of office equipment	510 510	578 000	612 000	633 000
Other	126 669	92 000	91 800	93 600
Sub-total	2 027 800	2 046 000	2 105 500	2 177 400
B. Supplies:				
Office supplies	327 710	260 300	296 000	302 000
Expendable equipment	170 218	163 000	163 000	166 200
Sub-total	497 928	423 300	459 000	468 200
C. Equipment:				
Office furniture and equipment	85 405	105 000	92 000	95 000
Transportation and equipment	10 869	28 000	31 000	31 000
Sub-total	96 274	133 000	123 000	126 000
TOTAL	2 622 002	2 602 300	2 687 500	2 771 600

APPROPRIATION SECTION 9

SHARED SUPPORT SERVICES

(COST OF WORK FOR OTHERS)

APPROPRIATION SECTION 9: SHARED SUPPORT SERVICES

Cost of work for others

Summary of cost

Table 134

Item of Expenditure	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Salaries - established posts - P	6 187 856	7 296 000	(444 000)	(6.1)	6 852 000	(46 000)	(0.7)	6 806 000	2.5	7 023 000	5.0	7 326 000
Temporary assistance - P	734 457	980 900	(225 900)	(23.0)	755 000	54 000	7.2	809 000	1.5	766 300	4.0	854 000
Salaries - established posts - GS & M&O	6 451 632	6 754 000	64 000	0.9	6 818 000	(24 000)	(0.4)	6 794 000	10.5	7 533 000	4.0	7 808 000
Temporary assistance - GS & M&O	558 264	379 500	(86 900)	(22.9)	292 600	-	-	292 600	9.0	318 900	3.0	328 500
Common staff costs	4 241 932	4 823 900	(75 200)	(1.6)	4 748 700	(24 000)	(0.5)	4 724 700	7.5	5 105 100	4.4	5 304 800
Overtime	73 860	69 300	9 800	14.1	79 100	-	-	79 100	9.0	86 200	2.9	88 700
Sub-total: Staff costs	18 248 001	20 303 600	(758 200)	(3.7)	19 545 400	(40 000)	(0.2)	19 505 400	6.6	20 832 500	4.4	21 710 000
Travel	165 834	51 600	5 800	11.2	57 400	(2 200)	(3.8)	55 200	0.9	57 900	1.3	56 400
Representation and hospitality	733	2 100	-	-	2 100	-	-	2 100	-	2 100	4.8	2 200
Training	41 780	87 500	15 800	18.1	103 300	-	-	103 300	1.0	104 300	4.1	108 600
Experts	62 609	22 300	37 700	169.1	60 000	-	-	60 000	1.0	60 600	1.0	61 200
Equipment: leased or rented	2 237 877	2 471 600	(389 300)	(15.8)	2 082 300	44 000	2.1	2 126 300	2.9	2 142 000	2.9	2 251 000
Equipment: purchased (construction)	542 368	503 600	(247 300)	(49.1)	256 300	8 000	3.1	264 300	0.7	258 000	1.8	271 000
Supplies and materials	2 240 222	2 470 800	(404 000)	(16.4)	2 066 800	(89 800)	(4.3)	1 977 000	3.3	2 135 700	3.4	2 111 600
General operating expenses	1 747 282	2 284 400	(18 800)	(0.8)	2 265 600	(43 000)	(1.9)	2 222 600	2.8	2 329 400	2.8	2 349 000
Contracts	528 919	173 000	504 800	291.8	677 800	5 000	0.7	682 800	4.5	708 000	4.6	746 000
Research and technical contracts	-	82 000	(77 000)	(93.9)	5 000	-	-	5 000	-	5 000	-	5 000
Miscellaneous	116 132	64 500	9 500	14.7	74 000	(1 000)	(1.4)	73 000	2.0	75 500	2.1	76 000
Sub-total: Other direct costs	7 683 756	8 213 400	(562 800)	(6.9)	7 650 600	(79 000)	(1.0)	7 571 600	3.0	7 878 500	3.1	8 038 000
Translation and records services	39 842	61 000	(9 000)	(14.8)	52 000	2 000	3.8	54 000	3.8	54 000	3.5	58 000
Printing and publishing services	112 375	103 000	(1 000)	(1.0)	102 000	1 000	1.0	103 000	6.9	109 000	2.6	113 000
Data processing services	750 200	921 000	(51 000)	(5.5)	870 000	(13 000)	(1.5)	857 000	4.6	910 000	3.6	929 000
Sub-total: Shared costs	902 417	1 085 000	(61 000)	(5.6)	1 024 000	(10 000)	(1.0)	1 014 000	4.8	1 073 000	3.5	1 100 000
SUB-TOTAL	26 834 174	29 602 000	(1 382 000)	(4.7)	28 220 000	(129 000)	(0.5)	28 091 000	5.5	29 784 000	4.1	30 848 000
Less: Cross-Charge (above)	902 417	1 085 000	(61 000)	(5.6)	1 024 000	(10 000)	(1.0)	1 014 000	4.8	1 073 000	3.5	1 100 000
Total Shared Support Services	25 931 757	28 517 000	(1 321 000)	(4.6)	27 196 000	(119 000)	(0.4)	27 077 000	5.6	28 711 000	4.0	29 748 000
Less: Agency's share	21 489 557	23 334 000	(1 062 000)	(4.6)	22 272 000	(85 000)	(0.4)	22 187 000	5.5	23 494 000	4.1	24 364 000
Cost of work for others	4 442 200	5 183 000	(259 000)	(5.0)	4 924 000	(34 000)	(0.7)	4 890 000	6.0	5 217 000	3.9	5 384 000

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SHARED SUPPORT SERVICES (COST OF WORK FOR OTHERS)

APPROPRIATION SECTION 9: SHARED SUPPORT SERVICES

Cost of work for others

Expenditure by service

Table 135

Service	1987 Actual expenditures	1988 Budget	Expenditure increase(decrease) %		1989 at 1988 prices	Expenditure increase(decrease) %		1990 at 1988 prices	Price increase %	1989 with price increase	Price increase %	1990 with price increase
Contract administration services	496 364	426 000	(4 000)	(0.9)	422 000	-	-	422 000	6.6	450 000	4.0	468 000
Conference services	660 603	749 000	(6 000)	(0.8)	743 000	(30 000)	(4.0)	713 000	6.9	794 000	4.3	795 000
Interpretation	901 564	1 012 000	(145 000)	(14.3)	867 000	58 000	6.7	925 000	2.3	887 000	4.4	988 000
Translation and records services	5 848 857	6 544 000	(236 000)	(3.6)	6 308 000	(8 000)	(0.1)	6 300 000	4.6	6 600 000	4.5	6 885 000
Medical services	1 051 361	1 153 000	(3 000)	(0.3)	1 150 000	-	-	1 150 000	6.6	1 226 000	3.8	1 273 000
Library	2 030 313	2 525 000	(200 000)	(7.9)	2 325 000	-	-	2 325 000	5.6	2 456 000	4.7	2 570 000
Data processing services	7 769 814	8 265 000	(105 000)	(1.3)	8 160 000	18 000	0.2	8 178 000	4.6	8 538 000	3.7	8 873 000
Printing and publishing	7 487 534	8 253 000	(717 000)	(8.7)	7 536 000	(201 000)	(2.7)	7 335 000	7.3	8 083 000	4.0	8 183 000
Radiation protection services	587 764	675 000	34 000	5.0	709 000	34 000	4.8	743 000	5.8	750 000	3.4	813 000
Sub-total	26 834 174	29 602 000	(1 382 000)	(4.7)	28 220 000	(129 000)	(0.5)	28 091 000	5.5	29 784 000	4.1	30 848 000
Less: cross-charge (above)	902 417	1 085 000	(61 000)	(5.6)	1 024 000	(10 000)	(1.0)	1 014 000	4.8	1 073 000	3.5	1 100 000
Total Shared Support Services	25 931 757	28 517 000	(1 321 000)	(4.6)	27 196 000	(119 000)	(0.4)	27 077 000	5.6	28 711 000	4.0	29 748 000
Less: Agency's share	21 489 557	23 334 000	(1 062 000)	(4.6)	22 272 000	(85 000)	(0.4)	22 187 000	5.5	23 494 000	4.1	24 364 000
Services provided to others	4 442 200	5 183 000	(259 000)	(5.0)	4 924 000	(34 000)	(0.7)	4 890 000	6.0	5 217 000	3.9	5 384 000

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SHARED SUPPORT SERVICES (COST OF WORK FOR OTHERS)

APPROPRIATION SECTION 9: SHARED SUPPORT SERVICES

Breakdown of costs by user - 1989

Table 136

	Contract administration services	Conference services	Translation and records services	Medical services	Library	Data processing services	Printing and publishing services	Interpre- tation	Radiation protection services	Total	%
Agency											
Appropriation Section 1	-	-	537 000	-	-	920 000	34 000	-	-	1 491 000	6.0
Appropriation Section 2	107 000	302 000	768 000	-	1 474 000	1 596 000	3 464 000	344 000	143 000	8 198 000	33.4
Appropriation Section 3	310 000	200 000	354 000	-	-	490 000	1 237 000	92 000	-	2 683 000	10.9
Appropriation Section 4	4 000	-	1 000	-	-	7 000	61 000	-	-	73 000	0.3
Appropriation Section 5	29 000	17 000	266 000	-	-	1 926 000	35 000	-	394 000	2 667 000	10.9
Appropriation Section 6	-	274 000	3 925 000	-	-	22 000	577 000	419 000	-	5 217 000	21.2
Appropriation Section 7	-	1 000	691 000	574 000	-	987 000	687 000	32 000	-	2 972 000	12.1
Appropriation Section 8	-	-	4 000	-	-	115 000	74 000	-	-	193 000	0.8
Appropriation Section 9	-	-	54 000	-	-	910 000	109 000	-	-	1 073 000	4.4
Sub-total	450 000	794 000	6 600 000	574 000	1 474 000	6 973 000	6 278 000	887 000	537 000	24 567 000	100.0
Less: Cross-charges	-	-	54 000	-	-	910 000	109 000	-	-	1 073 000	-
Sub-total Agency	450 000	794 000	6 546 000	574 000	1 474 000	6 063 000	6 169 000	887 000	537 000	23 494 000	-
Work for others											
UNIDO	-	-	-	466 000	612 000	858 000	902 000	-	-	2 838 000	
UNRWA	-	-	-	63 000	10 000	185 000	-	-	-	258 000	
AGRIS	-	-	-	-	-	242 000	-	-	-	242 000	
TC	-	-	-	-	-	215 000	-	-	213 000	428 000	
Other	-	-	-	123 000	360 000	65 000	903 000	-	-	1 451 000	
Sub-total Work for others	-	-	-	652 000	982 000	1 565 000	1 805 000	-	213 000	5 217 000	
TOTAL	450 000	794 000	6 546 000	1 226 000	2 456 000	7 628 000	7 974 000	887 000	750 000	28 711 000	

APPROPRIATION SECTION 9: SHARED SUPPORT SERVICES

Breakdown of costs by user - 1990

Table 137

	Contract administration services	Conference services	Translation and records services	Medical services	Library	Data processing services	Printing and publishing services	Interpre- tation	Radiation protection services	Total	%

Agency											
Appropriation Section 1	-	-	563 000	-	-	1 032 000	36 000	-	-	1 631 000	6.4
Appropriation Section 2	111 000	286 000	812 000	-	1 542 000	1 673 000	3 531 000	335 000	147 000	8 437 000	33.1
Appropriation Section 3	322 000	194 000	393 000	-	-	516 000	1 121 000	144 000	-	2 690 000	10.6
Appropriation Section 4	4 000	-	1 000	-	-	8 000	67 000	-	-	80 000	0.3
Appropriation Section 5	31 000	27 000	278 000	-	-	1 978 000	68 000	38 000	446 000	2 866 000	11.3
Appropriation Section 6	-	287 000	4 099 000	-	-	23 000	599 000	437 000	-	5 445 000	21.4
Appropriation Section 7	-	1 000	677 000	596 000	-	1 009 000	698 000	34 000	-	3 015 000	11.8
Appropriation Section 8	-	-	4 000	-	-	119 000	77 000	-	-	200 000	0.8
Appropriation Section 9	-	-	58 000	-	-	929 000	113 000	-	-	1 100 000	4.3
Sub-total	468 000	795 000	6 885 000	596 000	1 542 000	7 287 000	6 310 000	988 000	593 000	25 464 000	100.0
Less: Cross-charges	-	-	58 000	-	-	929 000	113 000	-	-	1 100 000	
Sub-total Agency	468 000	795 000	6 827 000	596 000	1 542 000	6 358 000	6 197 000	988 000	593 000	24 364 000	

Work for others											
UNIDO	-	-	-	484 000	642 000	854 000	936 000	-	-	2 916 000	
UNRWA	-	-	-	66 000	10 000	184 000	-	-	-	260 000	
AGRIS	-	-	-	-	-	266 000	-	-	-	266 000	
TC	-	-	-	-	-	217 000	-	-	220 000	437 000	
Other	-	-	-	127 000	376 000	65 000	937 000	-	-	1 505 000	
Sub-total Work for others	-	-	-	677 000	1 028 000	1 586 000	1 873 000	-	220 000	5 384 000	
TOTAL	468 000	795 000	6 827 000	1 273 000	2 570 000	7 944 000	8 070 000	988 000	813 000	29 748 000	

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SHARED SUPPORT SERVICES (COST OF WORK FOR OTHERS)

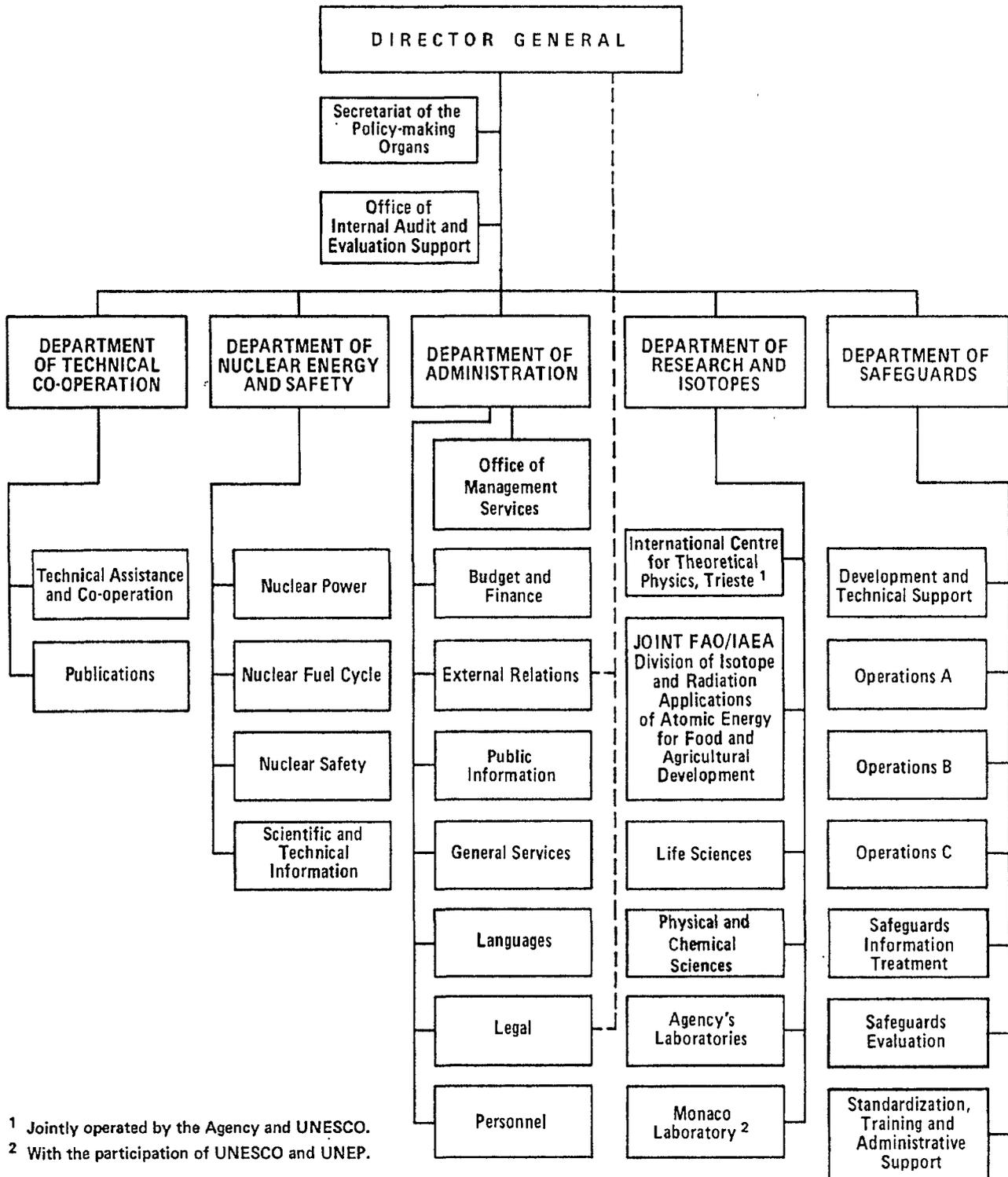
APPROPRIATION SECTION 9: SHARED SUPPORT SERVICES

Manpower by serviceTable 138

Division	1988 Adjusted				1989			
	P	GS	M&O	Total	P	GS	M&O	Total
Contract administration services	1	5	-	6	1	5	-	6
Conference services	5	8	-	13	5	8	-	13
Interpretation	8	1	-	9	8	1	-	9
Translation and records services	48	42	2	92	48	43	2	93
Medical services	3	15	3	21	3	15	3	21
Library	5	10	-	15	5	10	-	15
Data processing services	31	37	-	68	30	40	-	70
Printing and publishing	17	100	18	135	17	100	18	135
Radiation Protection Services	3	5	-	8	3	5	-	8
Total Appropriation Section	121	223	23	367	120	227	23	370

A N N E X A

ORGANIZATIONAL CHART



¹ Jointly operated by the Agency and UNESCO.

² With the participation of UNESCO and UNEP.

A N N E X B

TABLE OF CORRESPONDENCE BETWEEN PART II AND PART I

Part II Appropriation Section	Part I Programme/Area of Activity
1. TECHNICAL ASSISTANCE AND CO-OPERATION	S.3
2. NUCLEAR ENERGY AND SAFETY Nuclear Power Nuclear Fuel Cycle Nuclear Safety Scientific and Technical Information	A (less part of A.3) B, C (less part of C.2) H (less part of H.3), I, S.5.3 S.5.2, S.6.5 (Agency's share), part of A.3
3. RESEARCH AND ISOTOPES Food and Agriculture Life Sciences Physical and Chemical Sciences Agency Laboratory (allocated)	D E (less part of E.4), part of H.3 F, G (less G.2), part of A.3
4. OPERATIONAL FACILITIES International Centre for Theoretical Physics International Laboratory of Marine Radioactivity	G.2 Part of E.4, part of C.2
5. SAFEGUARDS Programme Co-ordination Operations A, Operations B, Operations C Development and Technical Support Information Treatment Evaluation Standardization, Training and Administrative Support	Part of S.1.1 J.2 Part of J.3 Part of J.3 Part of J.3 Part of J.3
6. POLICY-MAKING ORGANS	S.1.2
7. EXECUTIVE MANAGEMENT AND ADMINISTRATION Executive Management Administration	S.1.1 (less Safeguards Programme Co-ordination) S.2, S.5.1
8. GENERAL SERVICES	S.4
9. SHARED SUPPORT SERVICES Contract administration services Conference services Interpretation Translation and records services Medical service Library Data processing services Printing and publishing Radiation protection services	S.6.1 Part of S.6.2 Part of S.6.2 S.6.3 S.6.4 S.6.5 S.6.6 S.6.7 S.6.8

