THE AGENCY'S PROGRAMME AND BUDGET FOR 1987 AND 1988

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INTERNATIONAL ATOMIC ENERGY AGENCY

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CONTENTS

PART I

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
ADPI	Division of Public Information
ADPR	Division of Personnel
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
AGM	Advisory group meeting
Agency	International Atomic Energy Agency
ARCAL	Regional Co-operative Arrangements for the Promotion of Nuclear Science and Technology in Latin America
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
CM	Consultants' Meeting
CMEA	Council for Mutual Economic Assistance
CRP	Co-ordinated research programme
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 of Standardization	Division for Standardization, Training and Administrative Support
EEI	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
GESAMP	United Nations Joint Group of Experts on the Scientific Aspects of Marine Pollution
GS	General Service category (staff)
HEU	High-enriched uranium
HLW	High-level waste
HTGCR HTGR HTR	High-temperature gas-cooled reactor
HWR	Heavy-water reactor
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 Organization
IMO	International Maritime Organization
INDC	International Nuclear Data Committee
INIS	International Nuclear Information System
INPO	Institute of Nuclear Power Operations
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
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
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	Non-nuclear weapon
NPP	Nuclear power plant
NPT	Treaty on the Non-Proliferation of Nuclear Weapons (reproduced in document INFCIRC/140)
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	Organization for Economic Co-operation and Development
OSART	Operational Safety Review Team
P	Professional category (staff)
PHWR	Pressurized heavy-water reactor
PRA	Probabilistic risk analysis
PRIS	Power Reactor Information System
PSA	Probabilistic safety assessment
QA	Quality assurance
QC	Quality control
RAPAT	Radiation Protection Advisory Team

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)
RID	International Regulations Concerning the Transport of Dangerous Goods by Rail
RIFA	See Division of Food and Agriculture
RILS	Division of Life Sciences
RIML	International Laboratory of Marine Radioactivity (in Monaco)
RIRL	Division of Research and Laboratories
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 technqiue
SMPR	Small and medium power reactor
SNSP	Supplementary nuclear safety programme
SPM	Specialists' meeting
SSDL	Secondary Standard Dosimetry Laboratory
TCM	Technical committee meeting
TC	Technical co-operation
TCAC	Division of Technical Assistance and Co-operation
TCPU	Division of Publications
Tlatelolco Treaty	Treaty for the Prohibition of Nuclear Weapons in Latin America
TLD	Thermoluminescence dosimetry

TRCUD	Technical Review Committee on Underground Disposal
Trieste Centre	International Centre for Theoretical Physics (at Trieste)
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
WASP	Wien Automatic System Planning Package
WEC	World Energy Conference
WMO	World Meteorological Organization
World Bank (IBRD)	International Bank for Reconstruction and Development

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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 1987 and 1988. The Board requests the General Conference to adopt the draft resolutions in respect of 1987 set forth in Annex III. The Regular Budget figures presented in Annex III include the figure of US $ 2 030 000 which the Board decided should be included in the 1987 budget as the upper limit for financing additional activities in the field of nuclear safety and radiation protection. The detailed programme of additional activities will be formulated in an addendum to this document and will take into account the results of the analysis of the Chernobyl' accident, other expert group meetings scheduled for this summer and any additional comments received from Member States.

2. The budget estimates for 1988 have been prepared with the same degree of detail and accuracy as those for 1987 and are considered to be a realistic assessment of the financial resources that will be necessary for the implementation of the 1988 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 1988 will be presented to the General Conference at its thirty-first regular session.

FORMAT

3. The new format introduced for the 1985-86 programme budget was generally considered to be an improvement in that it gave a better picture of the actual work of the Agency. The division of the budget and programme document into two parts has been found useful and this pattern is again followed in the present document. In the discussions on the 1985-86 document it was stated that the process of programme formulation and the format of its presentation should be the subject of further step-by-step improvements.

4. Part I is the narrative part of the document. It describes the programme according to subject matter and is primarily meant for the governing bodies. It is felt that the 1985-86 presentation, which focused primarily on the work programme of that biennial period, could be improved to enable better identification of priority areas and long-term goals.

5. Consequently, a revised format has been adopted for Part I which focuses on the specific needs of Member States and provides an outline of the longer-term work plan. In order to tailor the work programme more specifically to the perceived needs of Member States, a larger number of individual projects have been formulated than there were sub-programmes in the 1985-86 programme and budget document. As was the case for the 1985-86 sub-programmes, projects are not confined to the limits of the Agency's organizational structure: their implementation often involves several Divisions. Part I shows the total resources foreseen for implementation in each Programme Area, Programme and Area of Activity. As far as possible, this information is also provided at the project level.

6. Part II provides programme information according to the organizational structure of the Agency. It is destined for programme managers and contains in tabular form the lists of actions to be taken by Divisions in carrying out the planned programme. It is designed to assist managers in planning and following up the implementation of their programmes. Financial tables and manpower tables, detailed by appropriation section, are also provided.

7. The pattern introduced in the 1985-86 programme budget of including technical co-operation activities has been further developed. Where applicable, reference is made to the support provided by technical Divisions for technical co-operation activities. The work involved in this support is taken into account in the allocation of manpower resources of these Divisions. It should be kept in mind that all references to technical co-operation activities are based on estimates and extrapolations because the details of this programme are not yet known and depend primarily on the actual needs and requests of developing Member States. Technical co-operation resources include, in addition to the Technical Assistance and Co-operation Fund, funds from the UNDP and other extrabudgetary sources.

8. The budgetary information in Part I is provided in the relevant tables in terms of the main means used to achieve objectives. Instead of providing estimates by item of expenditure (as in Part II), an attempt has been made to give indicative estimates for the main categories of means used in each programme and area of activity in respect of the Regular Budget for 1987/88.

9. The following broad categories of "main means" have been used:

"Meetings" include the cost of providing a forum for the exchange of information (conferences, symposia, seminars) including the cost of manpower required for preparing and holding such meetings;

"Publications" comprise the cost of preparing reports, guidelines, proceedings and so on, including the cost of staff, consultants, advisory groups and any other resources needed;

"Standards, Regulations" comprise the total cost of preparing and publishing them. In some programmes, however, these costs are shown under "Publications";

"Data base" consists mainly of computer and staff costs involved in setting up data bases such as INIS, PRIS, and CINDA;

"Research and Development" includes the cost of co-ordinated and other research programmes, their administration, manpower and laboratory services;

"Technical Co-operation Support and Advisory Services" include the staff costs relating to the support given by the technical Departments to the technical co-operation (TC) programme in selecting and briefing experts, designing training course programmes, evaluating equipment and the like. It also includes the actual costs of those advisory services and missions which are financed from the Regular Budget.

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

TECHNICAL PROGRAMME TRENDS

10. As mentioned in paragraph 1 above, the supplementary nuclear safety and radiation protection programme is under preparation and will be published in an addendum to this document. Consequently, the technical programme trends described below do not take into account the content of the additional programme.

Nuclear Power

11. Comprehensive assistance will be provided to Member States in strengthening their capability to develop an integrated approach to the planning of nuclear power programmes within a rational and coherent energy and general development policy. This assistance will include planning techniques and methodologies for energy and electricity demand forecasting and for determining the potential supply role of nuclear power. Emphasis will continue to be placed on the assessment of infrastructures and the implementation of infrastructure development programmes. A Senior Expert Group study on mechanisms to assist developing countries in the promotion of nuclear power programmes, including financing aspects, was initiated in 1986 and will be completed in 1987.

12. The programme will be implemented mainly through support for technical co-operation projects and direct advisory services within such projects. Training will continue to be an important component, with emphasis shifting from interregional courses to national courses, seminars and the planning and implementation of manpower development programmes for specific countries. The preparation of generally applicable planning procedures, guidebooks and manuals will be largely completed and made available to Member States. It is expected that individual case studies will be conducted which will include consideration of SMPRs (as a follow-up to the SMPR study published in 1985) and of low-temperature nuclear heat applications.

13. In the area of technical and economic performance of nuclear power, efforts will continue to focus on the assessment and dissemination of information in order to improve plant availability and overall performance. Use will be made of the increasing volume of data available in the Power Reactor Information System (PRIS) and efforts will be made to strengthen the QA and management capabilities of plant owner organizations. A major conference on nuclear power performance and safety will be held in 1987 with the objective of providing worldwide information on current trends in the performance and safety of nuclear power and its fuel cycle and on the performance and achievements which can be expected in the 1990s. This is a logical follow-up to the conference on nuclear power experience held in 1982, which was retrospective in character.

14. In the area of advanced reactor systems, an effective international forum will be provided for the exchange of technical information on improvements in reactor technologies and reactor designs aimed at better resource utilization and non-electrical applications of nuclear power. Greater emphasis will be given to cost reduction and design simplification in fast breeder reactors, gas-cooled high-temperature reactors and advanced water reactors.

Nuclear Fuel Cycle

15. Developments in most aspects of nuclear fuel cycle technology will be covered, with emphasis being given to those problems which need to be solved in order to ensure the steady development of nuclear power as a whole.

16. Information on world uranium and thorium resources and supply, on geologically favourable areas for exploration and on exploration and production technology will be gathered and made available to Member States. Increased attention will be given to the preparation of guides and manuals on different aspects of nuclear and reactor materials processing and production in order to assist in the establishment and implementation of such projects in developing countries.

17. Data will continue to be collected on the type, capacity and operational status of fuel cycle facilities throughout the world.

18. With regard to reactor fuel elements, efforts will focus on exchanging information on activities in Member States aimed at improving fuel design and the reliability of fuel elements under higher burn-up and load following conditions. Quality control in fuel fabrication will be promoted.

19. Spent fuel management activities will be expanded to include the evaluation of storage needs in Member States, the development of economic criteria for the optimization of spent fuel storage strategy, the improvement of spent fuel storage technology and the compilation of data on certain aspects of arisings and the potential utilization of fission products. More attention will be given to the problem of the reliability of structural materials in the back end of the nuclear fuel cycle.

Radioactive Waste Management

20. High priority will continue to be given to radioactive waste management because of its importance for the development of nuclear power and because of the increasing volumes of waste being generated from institutional uses of radionuclides. The main focus will continue to be the dissemination of technical and environmental information, the preparation of regulatory material and the provision of assistance to Member States conducting research and development in waste management areas of common interest.

21. In the area of waste processing and storage, attention will centre on the conditioning (immobilization) of all types of wastes, the evaluation of solid waste forms and packages, including spent fuel, and the handling and retention of airborne nuclides.

22. In decommissioning, emphasis will be placed on remote system technologies, developing regulatory procedures, and monitoring for compliance with waste management criteria, disposal of decommissioning waste and the re-use of slightly contaminated materials.

23. The development of international guidelines and technical criteria for underground disposal will continue, with emphasis being given to disposal in deep geological formations.

24. Greater assistance will be given to Member States in developing their national waste management programmes through advisory missions and the publication of technical documents relating specifically to this activity.

25. The guidance already given on the principles of exemption from regulatory control will be applied to the waste management field, notably in relation to the disposal of very low-level radioactive wastes in the terrestrial environment and slightly contaminated items from the nuclear industry.

26. Environmental safety assessments of nuclear facilities, including waste disposal sites, depend largely on the use of predictive modelling techniques. Activities aimed at improving predictive capabilities through data acquisition and model development and testing will continue.

27. Sea disposal activities will concentrate on the development of a source upper bound, the assessment of the impact of radionuclide releases on marine organisms and inter-agency co-operation on coastal modelling.

28. Collaboration between the Monaco Laboratory and the Department of Nuclear Energy and Safety has been strengthened. Work will focus principally on data collection for the evaluation of the environmental impact of radionuclide releases into the sea and on the development of analytical techniques.

Food and Agriculture

29. In co-operation with FAO, the appropriate use of nuclear and related biotechnological techniques for the solution of problems of economic importance to developing Member States in the areas of the production and protection of food and agriculture will continue to be promoted.

30. Efforts will concentrate on promoting the exploitation of isotope labelling and ionizing radiation for various applications. Isotope labelling is a useful tool in studies of plant nutrient supply, biological nitrogen fixation, animal nutrition and reproductive performance and the safe and efficient use of pesticides. Ionizing radiation can be employed as a means of assessing soil water content during cropping, inducing genetic mutations for crop improvement, producing vaccines against livestock diseases, sterilizing mass-reared insects for use in sterile insect technique campaigns, and preserving food.

31. Biotechnological applications will also receive increased attention. These complement the above techniques especially in studies of nitrogen fixation, in vitro propagation of crops and the use of enzyme immunoassay to evaluate animal reproduction and to detect contagious diseases, to separate sexes in mass-reared insects, to elaborate alternative biological insect control methods and to manipulate microorganisms that break down biomass.

32. Since wider acceptance of food irradiation by Member States is expected in the near future, greater emphasis will be placed on this area and, in particular, on regulatory, economic and marketing aspects.

33. The Agency's Agricultural Laboratory will provide essential support for these activities, especially through training in the form of courses and fellowships.

Human Health

34. The significant results obtained in previous years in the fields of in vivo and in vitro nuclear medicine techniques, applied radiation biology, intracavitary radiotherapy of cancer, radiation dosimetry and nutritional and health-related environmental studies provide the basis for activities in this area, many of which are carried out in co-operation with WHO and other international organizations.

35. In nuclear medicine, emphasis will be given to radionuclide applications or techniques that are of special relevance to developing countries. Applications will focus on communicable diseases such as parasitic infections and tuberculosis and on problems of concern in iodine-deficient environments. Techniques will be promoted which facilitate the local preparation of reagents, which can be implemented easily and with simple equipment, or which improve quality control of instruments and procedures. Comparative assessments will be made of the relative effectiveness of competing nuclear and non-nuclear techniques.

36. In radiation biology, efforts will centre on the promotion of radiation techniques, particularly in developing countires, for the sterilization of medical products and tissue grafts and for the improvement of fermentation processes which enhance the nutritional value of cassava.

37. In radiotherapy, activities will focus mainly on the promotion of intracavitary gamma and neutron irradiation for cancer treatment.

38. Following the increase in the number of Secondary Standard Dosimetry Laboratories (SSDLs) in Member States, further development aimed at promoting the quality of their work is planned. A dose intercomparison service for radiotherapy in Member States where no SSDL is available will be continued. In order to develop the use of radiation dosimetry as a quality control measure in radiation processing, the International Dose Assurance Service will be expanded.

39. The application of nuclear techniques in nutritional and health-related environmental studies will continue to be promoted. Emphasis will be given to the investigation of nutritional deficiencies of essential nutrients (particularly trace elements and protein) and to the monitoring of toxic heavy metal pollution in air, foodstuffs, water, marine specimens and human tissues.

40. With the financial support of UNEP and WMO, work will continue at the Agency's Laboratories in Monaco and Seibersdorf in connection with UNEP's regional seas action plan and the WMO's background pollution monitoring (BAPMoN) programme.

Industry and Earth Sciences

41. With regard to the industrial applications of nuclear techniques, attention will focus on those techniques which help reduce environmental pollution resulting from industrial activities. The application of radiation technology in biomass conversion will continue to be promoted, and greater attention will be given to those tracer methods which will expand the range of applications. In non-destructive testing, training and certification will continue to be the main activities .

42. As regards the application of nuclear techniques to develop natural resources, the latest developments in ore exploration and exploitation will be reviewed.

43. In hydrology, all major fields of interest will be covered: surface waters, groundwater and geothermal waters. As in the past and in view of the recurrent droughts affecting large regions of the world, emphasis will be given to the assessment of groundwater resources in arid lands, for which isotope techniques are a powerful tool. Current and new isotope hydrology projects in the Sahel countries of Africa will be grouped within a regional project in order to co-ordinate activities and encourage the exchange of experience and results.

44. Support will be also given to groundwater studies related to waste disposal problems, especially the assessment of the groundwater dynamics of impervious rock formations of the type used for radioactive waste disposal.

45. Priority will be given to training and the dissemination of information as well as to the establishment and upgrading of isotope and geochemical hydrology laboratories in developing countries. The Agency's Isotope Hydrology Laboratory will provide essential support for this work.

46. The main lines of the hydrology programme described above are based on growing demand from Member States and are largely a continuation of current activities. In recent years three large co-ordinated research programmes have been initiated: one on isotope hydrology in Latin America; the second, also in Latin America, on isotope techniques in geothermics; and the third on the dating of very old groundwater, which is important for waste disposal site assessment. Also, a regional programme on various hydrological problems in arid lands has been completed in three Northern African countries.

Physical and Chemical Sciences

47. The International Centre for Theoretical Physics continues 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 now also sponsors a number of selected activities in physics being held in Third World countries. Sponsorship of such activities is closely co-ordinated with similar activities of the Third World Academy of Sciences, which has recently established its headquarters in Trieste.

48. In addition to the Centre's continuing efforts to aid individual scientists working in developing countries, increasing emphasis is being given to encouraging the development of centres of excellence in these countries and to strengthening their ties with other such centres elsewhere.

49. The Centre has also developed the means to organize a series of courses in various regions to acquaint Third World physicists with the latest microprocessor technology, which is now accessible even to institutions with very modest resources.

50. The Centre's programme of Fellowships in Italian laboratories will continue to enable a number of young physicists to broaden their laboratory experience considerably. It is hoped that other countries may follow Italy's example.

51. In the applied nuclear physics area, work aimed at developing appropriate nuclear techniques and methods and at transferring technology to developing countries will be complemented by a comprehensive programme of activities relating to nuclear instrumentation. As a result of the increasingly widespread introduction of computers in nuclear research and applications, it is essential to study problems relating to the optimization of the use of computers and to design effective methods for providing training in this field. In addition, more attention will be paid to the selection and maintenance of the nuclear equipment supplied to developing countries under TC projects.

52. Particular attention will be paid to the applicability of certain inexpensive nuclear methods (the use of solid state nuclear track detectors, for example) in view of their value for nuclear research laboratories with limited resources.

53. The use of research reactors for applied research is becoming more important, particularly in developing countries. While the trend in advanced laboratories is towards high-flux reactors, there is increasing interest in developing countries in small reactors, mainly for neutron activation analysis, isotope production and training purposes. The capabilities and limitations of low-flux reactors will be studied so that sound advice can be given to laboratories interested in acquiring a research reactor.

54. In chemistry, methods of preparing radiopharmaceuticals will continue to be promoted. Emphasis will be placed on the application of nuclear analytical techniques in mineral exploration and on the provision of assistance to developing Member States in establishing reliable and accurate analytical capabilities.

55. As in the past, the Agency's Laboratory will play an essential role by providing experimental back-up, reference materials, analytical services and training.

56. In the nuclear data field, efforts will continue to focus on the transfer of nuclear data information and expertise to Member States and on the training of scientific and technical personnel in developing countries in the use of such data in nuclear applications. Particular emphasis will be placed on the development of standard reference data and on the improvement of basic

nuclear and atomic data for medical radiotherapy, radioisotope production, radiation damage of nuclear materials, nuclear geophysics applications and fusion reactor development.

Safety of Nuclear Installations

57. Increasing emphasis will be placed on providing assistance to Member States through TC projects. In view of the growing number of operating reactor installations in the world, efforts will concentrate on the operational safety of these installations.

58. Work on operational safety will include 4-5 operational safety review team (OSART) missions a year to both nuclear power plants and research reactors; improving the exchange of operational safety experience among Member States; assisting Member States in establishing the root causes of safety-related plant events; developing improved methods of establishing good performance; and assisting developing countries in expanding their safety analysis capability.

59. With the development of the NUSS programme (5 codes and 55 guides) now having been completed, emphasis will be placed on the implementation of these recommendations in requesting countries. Some supporting documents will be produced in response to particular implementation needs, but no extensive modification programme is foreseen in the near future. In line with the particular needs of Member States, efforts to promote implementation will include assisting Member States in establishing regulatory organizations, assisting in siting studies and developing national capabilities in design assessment, safety analysis reviews and regulatory inspection of construction.

60. The advice of the International Nuclear Safety Advisory Group (INSAG) will be an important element in guiding the work. Particular issues already considered by INSAG (source term, feedback of operational safety experience, quality assurance) will be followed by other questions important to the safety of nuclear installations.

61. Risk assessment techniques have now been generally accepted as important tools in analysing, evaluating and improving nuclear safety. Activities will centre on training staff from developing countries and assisting Member States in the practical use of results. A series of technical documents is being prepared which will demonstrate - on the basis of case studies - how probabilistic safety assessment (PSA) results are being used for safety decisions. In conjunction with INSAG, emphasis will be given to the use of PSA results in developing operator computer aids and in training operators to cope with severe accidents. In co-operation with ILO, UNEP, WHO and other international organizations, the Agency will assist Member States in performing risk management case studies and will develop guidance on the use of risk assessment techniques.

Radiation Protection

62. Basic criteria and standards will continue to be developed and a universal common understanding of these criteria promoted. Emphasis is shifting towards their practical implementation in situations where exposure can be controlled as well as in abnormal situations.

63. The Basic Safety Standards for Radiation Protection (BSS) define radiation protection philosophy in the form of a dose limitation system. The emphasis in promoting radiation protection is currently on providing practical guidelines for implementing the protection principles. This is an important step towards the goal of keeping exposures to ionizing radiation as low as reasonably achievable, economic and social factors being taken into account. Practical guidance and specific recommendations will be prepared for safe design and operation of faciliites involving ionizing radiation as part of occupational radiation protection, including mining and milling operations. Guidance will also be provided on the protection of the public and the environment, transport radiation safety (an area in which the Agency's authority is recognized world wide), emergency planning and preparedness, medical aspects of radiation protection and a number of other subjects.

64. Efforts to identify needs and resources for mutual emergency assistance will continue in the form of written guidelines, various types of training and fellowships, seminars, symposia, and safety missions to Member States.

International Nuclear Information System (INIS)

65. After sixteen years of growth and development, INIS has reached the status of a mature, well-established system. Future changes will be made largely to take advantage of new developments in communications and information-handling technology such as improved network facilities, microcomputers, new methods of computer-driven typesetting and new machine-storage systems. As a result of joining INIS, some developing countries have been able to improve their own infrastructure in the technical information service area. This trend is expected to continue as the INIS Secretariat places increasing emphasis on training and other assistance to Member States.

Safeguards

66. Inspection goal attainment is a vital objective of safeguards implementation. It is therefore the aim of the Department of Safeguards to increase the proportion of inspection goals attained and, although the programme is divided into a number of "Areas of Activity", it should be emphasized that each area contributes to the objective of increased goal attainment.

67. The proportion of facilities in which inspection goals were achieved for the whole facility rose from 27% in 1979 to 53% in 1984. Safeguards implementation and the attainment of inspection goals depend on the co-operation of the Agency with States and operators, on the availability of trained manpower and safeguards equipment, and not least on adequate financial resources. One limiting factor has been the severe budgetary constraints of the last two years which are expected to continue in 1987. This has led to a limitation on the number of inspectors and hence on the number of days of inspection carried out. During the past two years the coverage in non-nuclear-weapon States of the inspection effort required by Subsidiary Arrangements has remained static at about 70%. It is expected to remain at around this level during the period 1987 to 1989. A modest increase in the number of days of inspection to be carried out in nuclear-weapon States under voluntary offer agreements is planned in 1987 and 1988.

68. The Safeguards Implementation Report (SIR) provides an annual summary of the results of the Agency's safeguards activities. The SIR criteria for the attainment of inspection goals have now been in use for more than five years and have remained essentially unchanged in that period. Further refinement of the SIR criteria will continue. More compehensive criteria will also continue to be developed. Activities relating to quality assurance will be consolidated.

69. The volume of information to be treated is increasing each year as a result of growing inspection activities and the expanding number of installations under safeguards or containing safeguarded material. It is expected that, at the current rate of growth, the new mainframe computer installed at the end of 1985 will satisfy safeguards data processing requirements for the next three years. Development of computer support for use in the field by safeguards inspectors will continue. The objectives of a future IAEA Safeguards Information System (ISIS) which will eventually replace the existing one are being refined and the computer basis for a management information system using various sources of information is being developed.

70. The inventory of equipment for use by inspectors continues to rise, with more than $2 million invested each year. Other services such as the processing of seals and films will expand in line with increases in safeguards implementation. It is expected that this trend will continue in the period under review. A number of research and development projects have been successfully completed and safeguards approaches for new facility types have been developed. Research and development activities will continue with the assistance of national support programmes.

71. Emphasis has been placed on the development and implementation of standardized computerized reporting methods. These efforts will continue for all types of facilities. Work will also continue on the standardization of Subsidiary Arrangements. Basic and advanced training will be provided for staff of the Department, as will training in areas of specific relevance for personnel from Member States.

TECHNICAL ASSISTANCE AND CO-OPERATION

72. It is expected that funds available for technical co-operation will continue to grow in 1987 and 1988. While the actual degree of growth in extrabudgetary resources can only be estimated, a substantial increase in such funds is probable. Growth of 12% per annum for 1987 and 1988 in the Technical Assistance and Co-operation Fund, the mainstay of the programme, now seems assured.

73. In addition to handling an increased 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. A review of the present annual programming cycle aimed at achieving a more even distribution of project appraisal and monitoring throughout the year may make it possible to obtain greater output and higher quality within existing budgetary constraints.

74. By the end of 1986 the computerized management information system will cover all technical co-operation funds and activities, including training courses. Increased emphasis will subsequently be placed on linking the technical Departments to this system in order to ensure a more cohesive and integrated approach to all aspects of the technical co-operation programme.

EXCHANGE RATE

75. For the purpose of presenting the budget estimates for 1987 and 1988 and in order to facilitate comparison with the 1986 budget, an exchange rate of 19.50 Austrian schillings to the United States dollar has been used throughout the document. In view of the tight schedule for the preparation and production of the budget, it was indicated to Member States during the budget consultation period that this exchange rate would be used for presentation since the 1986 budget estimates were already available in detail and recalculation at a new exchange rate could be avoided. Only the actual expenditures for 1985 had to be converted to the rate of AS 19.50 so that they could also be presented, for comparison, at that exchange rate.

76. Following a recommendation by the Board of Governors, a resolution was passed at the twenty-ninth regular session of the General Conference, which solves the problem of providing the lowest level of resources for implementing the Agency's approved programme in spite of currency fluctuations. The solution approved allows clearer and more transparent control in that expenditures recorded in the books are directly comparable with the ceilings authorized by the General Conference.

77. 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 1986.

THE REGULAR BUDGET FOR 1987

78. The total of the Regular Budget estimates for 1987 as shown in Table 54, The Regular Budget by Appropriation Section, is $ 103 899 000, presented at an exchange rate of 19.50 schillings to the dollar. The Regular Budget by Department is shown in Table 56, and by Item of Expenditure in Table 57.

79. As can be seen in Table 55, there is an expenditure increase of $ 1 770 000 under Appropriation Section 2, Nuclear Energy and Safety, in respect of the supplementary nuclear safety programme. The expenditure increase of $ 348 000 in Appropriation Section 3, Research and Isotopes, relates partly to the supplementary nuclear safety programme and partly to an increase in co-ordinated research programmes. An expenditure increase of $ 34 000 in Appropriation Section 1, Technical Assistance and Co-operation, is required to cope with the workload resulting from the annual increase of 12% in the indicative planning figure; it is offset by an identical expenditure decrease under Appropriation Section 6, Policy-making Organs. The total expenditure increase for Agency programmes amounts to 2.2% for 1987.

80. In order to provide better control over some items of expenditure which had previously been included in Common Staff Costs and in Shared Support Services, these items are transferred to Personnel in Appropriation Section 7, Executive Management and Administration, in the 1987 estimates. As a result, charges for Common Staff Costs for all programmes are reduced and represent 37.5% of salaries for established posts in 1987 compared with 38% in the 1986 budget. The transferred items relate mainly to the cost of language training and staff representation at meetings of international bodies such as ICSC, CCAQ and United Nations Pension Fund. The "1986 Adjusted" column in Table 55 shows what the 1986 estimates would have been if these adjustments had been made in 1986 and thus provides a comparable basis for the 1987 estimates.

81. Appropriation Section 9, Shared Support Services, shows an expenditure decrease of $ 409 000 for 1987. This reflects a reduction in work for other organizations, mainly in respect of data processing and printing services. Shared support services have been established at a certain capacity as regards both manpower and equipment. Reductions in the contributions of other organizations can lead to difficulties for the Agency if it is not possible to adjust this capacity, which basically represents fixed costs.

82. For 1988, an expenditure increase of 1.3% in total has been foreseen.

83. Price increases for the items of expenditure making up the Agency's Regular Budget are expected to amount to 3.5% for 1987.

84. Since it is foreseen that in 1987 the post adjustment for Professional staff in Vienna will continue to be frozen at the present level, while GS and M&O staff can expect a 4% salary increase, total price increases for salaries and wages vary depending on the composition of the staff in each Division. The average - including some within-grade increments and rises in post adjustment for areas where it will not be frozen - is 3%. Common staff costs are assumed to be 37.5% of salaries.

85. For other items of expenditure, actual increases incurred during the past year have been used. Variations between programmes may be due to different assumptions, as in the case of salaries described above, or to the necessity for rounding. For 1988, increases of 4.8% are foreseen, since the freeze on Professional salaries in Vienna may have been lifted by that time.

86. It is proposed that the Regular Budget estimates for 1987 of $ 103 899 000 be funded after deduction of estimated income of $ 7 990 000, by an assessment on Member States of $ 95 909 000 (see Table 3, Regular Budget, Summary of Income). The assessment for 1987 is an increase of $ 5 339 000 over the assessment for 1986, all figures being presented at an exchange rate of AS 19.50. As in the past, assessments for 1987 will be reduced by Member States' shares in the Agency's cash surplus in respect of 1984.

87. In the present environment of limited resources, it is necessary to make efforts to increase the efficiency and productivity of the work. In preparing the programme and budget for 1987-88, such efforts have been made and, with the savings achieved through such measures, it has been possible to increase the volume of activity by more than the increase in expenditure. In this connection a simple method of measuring the volume of work irrespective

of the volume of expenditures has been applied. This method employs different measurement units depending on the activity in question.

88. For safeguards, a useful unit is the number of man-days of inspection. The budget estimates for 1986 foresee, as an overall measure, 8300 man-days of inspection. For 1987, the target was set at 8800 man-days of inspection, or an increase of 6%. It is planned to achieve this objective with zero growth in resources. For 1988, the plan foresees 9000 man-days of inspection, an increase of 2.3% in activity, to be achieved with a 1% increase in resources.

89. In other areas, variations in the volume of activity are measured by the number of meetings, publications, CRPs and so on. As mentioned in paragraph 9, these tasks are identified as "main means" for achieving objectives.

90. Calculations performed using this approach show that the volume of activities as proposed in the 1987-88 programme budget will increase by 6.5% for the two-year period, which corresponds to 4.2% on an annual basis. This increase in activity is to be achieved with a 2.9% increase in resources for the two-year period.

MANNING TABLE

91. Requests for additional manpower have been scrutinized through the internal review process which has been established for the purpose of reviewing human resources requirements in the light of programme trends and the overall utilization of manpower.

92. For 1987, a net increase of 6 Professional posts and 8 GS posts is considered to be needed. In addition, the regularization of 27 temporary assistance positions, for which a long-term need has been proven, is foreseen. These regularizations have no budgetary impact.

93. 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 1986.

94. For 1988, the staffing situation could not be reviewed in the same manner since a number of decisions may depend on programme implementation in 1987, and hence no requests for new posts in 1988 are being submitted at the present time. The overall budgetary estimates are nonetheless considered to be appropriate since manpower is only one of the possible resources for implementing the programme.

EXTRABUDGETARY RESOURCES

95. As in previous years, information is provided on the total extrabudgetary resources expected to be available to the Agency for carrying out its programme in 1987 and 1988. Funds from other United Nations organizations are shown separately (see Table 1(a) and 1(b), Total Resources for Implementation in 1987 and 1988).

96. 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.

TARGET FOR VOLUNTARY CONTRIBUTIONS TO THE TECHNICAL ASSISTANCE AND CO-OPERATION FUND

97. 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 agreed to recommend that the target for 1987 be established at $ 34 million. Taking into account miscellaneous income, it is expected that the Fund will amount in total to $ 35 million.

WORKING CAPITAL FUND

98. It is proposed that for 1987 the Agency's Working Capital Fund remain at the same level as for 1986, namely $ 2 million. This amount is adequate when Member States' contributions are made in a timely manner. The proposal is reflected in draft resolution C set forth in Annex III.

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

99. In accordance with Article XVI of the Agency's relationship agreement with the United Nations[a/], 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.

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a/ INFCIRC/II, Part I.

T A B L E S 1 - 4

TOTAL RESOURCES FOR IMPLEMENTATION IN 1987

Table 1(a)

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	4 382 000	-	2 725 000	-	7 107 000	4.4
B. Nuclear Fuel Cycle	1 508 000	-	2 150 000	-	3 658 000	2.3
C. Radioactive Waste Management	2 874 000	-	652 000	151 000	3 677 000	2.3
Sub-Total	8 764 000	-	5 527 000	151 000	14 442 000	9.0
2. NUCLEAR APPLICATIONS						
D. Food and Agriculture	5 317 000	1 319 000	14 701 000	837 000	22 174 000	13.6
E. Human Health	3 504 000	410 000	6 140 000	211 000	10 265 000	6.3
F. Industry and Earth Sciences	1 553 000	600 000	1 073 000	290 000	3 516 000	2.2
G. Physical and Chemical Sciences	5 130 000	960 000	7 910 000	11 102 000	25 102 000	15.4
Sub-Total	15 504 000	3 289 000	29 824 000	12 440 000	61 057 000	37.5
3. NUCLEAR SAFETY AND RADIATION PROTECTION						
H. Radiation Protection	2 817 000	-	3 555 000	42 000	6 414 000	3.9
I. Safety of Nuclear Installations	3 648 000	-	3 157 000	54 000	6 859 000	4.2
Sub-Total	6 465 000	-	6 712 000	96 000	13 273 000	8.1
4. SAFEGUARDS						
J.1. Information Treatment	4 506 000	-	-	-	4 506 000	2.8
J.2. Safeguards Operations	17 067 000	-	-	-	17 067 000	10.5
J.3. Development and Technical Support	9 475 000	-	-	3 620 000	13 095 000	8.1
J.4. Safeguards Evaluation	1 779 000	-	-	-	1 779 000	1.1
J.5. Standardization, Training and Administrative Support	1 535 000	-	-	-	1 535 000	0.9
Sub-Total	34 362 000	-	-	3 620 000	37 982 000	23.4
S. DIRECTION AND SUPPORT						
S.1. General Management and Secretariat of the Policy-making Organs	5 944 000	-	-	-	5 944 000	3.6
S.2. Administration	7 786 000	-	-	-	7 786 000	4.8
S.3. Technical Co-operation Servicing and Co-ordination	5 207 000	-	-	-	5 207 000	3.2
S.4. General Services	10 401 000	-	-	-	10 401 000	6.4
S.5. Specialized Service Activities	5 062 000	-	437 000	-	5 499 000	3.4
S.6. Shared Support Services [c/]	979 000	-	-	-	979 000	0.6
Sub-Total	35 379 000	-	437 000	-	35 816 000	22.0
Total Agency programmes	100 474 000	3 289 000	42 500 000	16 307 000	162 570 000	100.0
Services provided to others	3 425 000	-	-	-	3 425 000	
TOTAL	103 899 000	3 289 000	42 500 000	16 307 000	165 995 000	
SOURCE OF FUNDS						
Assessment on Member States	95 909 000	-	-	-	95 909 000	
Income from work for others	3 425 000	-	-	-	3 425 000	
Other miscellaneous income	4 565 000	-	-	-	4 565 000	
Other UN organizations	-	3 289 000	3 550 000	-	6 839 000	
Technical Assistance and Co-operation Fund	-	-	32 950 000	-	32 950 000	
Extrabudgetary Resources	-	-	6 000 000	16 307 000	22 307 000	
TOTAL	103 899 000	3 289 000	42 500 000	16 307 000	165 995 000	

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

b/ TC resources include those foreseen for the actual implementation in 1987. Allocations to individual programmes in this table are only indicative, based on extrapolations of past experience and do not prejudge in any way the priorities to be set by Member States.

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

TOTAL RESOURCES FOR IMPLEMENTATION IN 1988

Table 1(b)

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	4 570 000	-	2 982 000	-	7 552 000	4.4
B. Nuclear Fuel Cycle	1 601 000	-	2 352 000	-	3 953 000	2.3
C. Radioactive Waste Management	3 219 000	-	713 000	82 000	4 014 000	2.3
Sub-Total	9 390 000	-	6 047 000	82 000	15 519 000	9.0
2. NUCLEAR APPLICATIONS						
D. Food and Agriculture	5 634 000	1 319 000	16 085 000	851 000	23 889 000	13.9
E. Human Health	3 674 000	410 000	6 718 000	150 000	10 952 000	6.4
F. Industry and Earth Sciences	1 617 000	600 000	1 174 000	140 000	3 531 000	2.0
G. Physical and Chemical Sciences	5 403 000	960 000	8 654 000	11 102 000	26 119 000	15.2
Sub-Total	16 328 000	3 289 000	32 631 000	12 243 000	64 491 000	37.5
3. NUCLEAR SAFETY AND RADIATION PROTECTION						
H. Radiation Protection	2 929 000	-	3 890 000	45 000	6 864 000	4.0
I. Safety of Nuclear Installations	4 186 000	-	3 454 000	57 000	7 697 000	4.5
Sub-Total	7 115 000	-	7 344 000	102 000	14 561 000	8.5
4. SAFEGUARDS						
J.1. Information Treatment	5 059 000	-	-	-	5 059 000	2.9
J.2. Safeguards Operations	18 120 000	-	-	-	18 120 000	10.5
J.3. Development and Technical Support	9 522 000	-	-	3 420 000	12 942 000	7.5
J.4. Safeguards Evaluation	1 924 000	-	-	-	1 924 000	1.1
J.5. Standardization, Training and Administrative Support	1 698 000	-	-	-	1 698 000	1.0
Sub-Total	36 323 000	-	-	3 420 000	39 743 000	23.0
S. DIRECTION AND SUPPORT						
S.1. General Management and Secretariat of the Policy-making Organs	6 321 000	-	-	-	6 321 000	3.6
S.2. Administration	8 269 000	-	-	-	8 269 000	4.8
S.3. Technical Co-operation Servicing and Co-ordination	5 549 000	-	-	-	5 549 000	3.2
S.4. General Services	10 981 000	-	-	-	10 981 000	6.4
S.5. Specialized Service Activities	5 342 000	-	478 000	-	5 820 000	3.4
S.6. Shared Support Services [c/]	1 028 000	-	-	-	1 028 000	0.6
Sub-Total	37 490 000	-	478 000	-	37 968 000	22.0
Total Agency programmes	106 646 000	3 289 000	46 500 000	15 847 000	172 282 000	100.0
Services provided to others	3 613 000	-	-	-	3 613 000	
TOTAL	110 259 000	3 289 000	46 500 000	15 847 000	175 895 000	
SOURCE OF FUNDS						
Assessment on Member States	101 944 000	-	-	-	101 944 000	
Income from work for others	3 613 000	-	-	-	3 613 000	
Other miscellaneous income	4 702 000	-	-	-	4 702 000	
Other UN organizations	-	3 289 000	3 500 000	-	6 789 000	
Technical Assistance and Co-operation Fund	-	-	37 000 000	-	37 000 000	
Extrabudgetary Resources	-	-	6 000 000	15 847 000	21 847 000	
TOTAL	110 259 000	3 289 000	46 500 000	15 847 000	175 895 000	

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

b/ TC resources include those foreseen for actual implementation in 1988. Allocations to individual programmes in this table are only indicative, based on extrapolations of past experience and do not prejudge in any way the priorities to be set by Member States.

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	1986 Budget	Expenditure increase(decrease) a/	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
1. NUCLEAR POWER AND THE FUEL CYCLE											
A. Nuclear Power	3 841 000	402 000	10.5	4 243 000	(27 000)	(0.6)	4 216 000	3.3	4 382 000	4.9	4 570 000
B. Nuclear Fuel Cycle	1 455 000	9 000	0.6	1 464 000	19 000	1.3	1 483 000	3.0	1 508 000	4.8	1 601 000
C. Radioactive Waste Management	2 592 000	191 000	7.4	2 783 000	193 000	6.9	2 976 000	3.3	2 874 000	4.7	3 219 000
Sub-Total	7 888 000	602 000	7.6	8 490 000	185 000	2.2	8 675 000	3.2	8 764 000	4.9	9 390 000
2. NUCLEAR APPLICATIONS											
D. Food and Agriculture	5 102 000	23 000	0.5	5 125 000	52 000	1.0	5 177 000	3.7	5 317 000	4.9	5 634 000
E. Human Health	3 247 000	138 000	4.3	3 385 000	4 000	0.1	3 389 000	3.5	3 504 000	4.7	3 674 000
F. Industry and Earth Sciences	1 488 000	14 000	0.9	1 502 000	(12 000)	(0.8)	1 490 000	3.4	1 553 000	5.0	1 617 000
G. Physical and Chemical Sciences	4 914 000	45 000	0.9	4 959 000	43 000	0.9	5 002 000	3.4	5 130 000	4.5	5 403 000
Sub-Total	14 751 000	220 000	1.5	14 971 000	87 000	0.6	15 058 000	3.6	15 504 000	4.7	16 328 000
3. NUCLEAR SAFETY AND RADIATION PROTECTION											
H. Radiation Protection	2 134 000	591 000	27.7	2 725 000	(20 000)	(0.7)	2 705 000	3.4	2 817 000	4.7	2 929 000
I. Safety of Nuclear Installations	2 867 000	665 000	23.2	3 532 000	342 000	9.7	3 874 000	3.3	3 648 000	4.6	4 186 000
Sub-Total	5 001 000	1 256 000	25.1	6 257 000	322 000	5.1	6 579 000	3.3	6 465 000	4.7	7 115 000
4. SAFEGUARDS											
J.1. Information Treatment	3 899 000	465 000	11.9	4 364 000	315 000	7.2	4 679 000	3.3	4 506 000	4.7	5 059 000
J.2. Safeguards Operations	16 558 000	(14 000)	(0.1)	16 544 000	181 000	1.1	16 725 000	3.2	17 067 000	5.0	18 120 000
J.3. Development & Technical Support	9 804 000	(665 000)	(6.8)	9 139 000	(355 000)	(3.9)	8 784 000	3.7	9 475 000	4.5	9 522 000
J.4. Safeguards Evaluation	1 676 000	54 000	3.2	1 730 000	52 000	3.0	1 782 000	2.8	1 779 000	5.0	1 924 000
J.5. Standardization, Training and Administrative Support	1 404 000	88 000	6.3	1 492 000	83 000	5.6	1 575 000	2.9	1 535 000	4.8	1 698 000
Sub-Total	33 341 000	(72 000)	(0.2)	33 269 000	276 000	0.8	33 545 000	3.3	34 362 000	4.8	36 323 000
S. DIRECTION AND SUPPORT											
S.1. General Management and Secretariat of the Policy-making Organs	5 877 000	(124 000)	(2.1)	5 753 000	77 000	1.3	5 830 000	3.3	5 944 000	5.0	6 321 000
S.2. Administration	7 150 000	374 000	5.2	7 524 000	91 000	1.2	7 615 000	3.5	7 786 000	4.9	8 269 000
S.3. Technical Co-operation Servicing and Co-ordination	5 022 000	14 000	0.3	5 036 000	75 000	1.5	5 111 000	3.4	5 207 000	5.0	5 549 000
S.4. General Services	9 981 000	(12 000)	(0.1)	9 969 000	100 000	1.0	10 069 000	4.3	10 401 000	4.6	10 981 000
S.5. Specialized Service Activities	5 074 000	(194 000)	(3.8)	4 880 000	29 000	0.6	4 909 000	3.7	5 062 000	4.9	5 342 000
S.6. Shared Support Services	891 000	54 000	6.1	945 000	1 000	0.1	946 000	3.6	979 000	4.9	1 028 000
Sub-Total	33 995 000	112 000	0.3	34 107 000	373 000	1.1	34 480 000	3.7	35 379 000	4.9	37 490 000
Total Agency programmes	94 976 000	2 118 000	2.2	97 094 000	1 243 000	1.3	98 337 000	3.5	100 474 000	4.8	106 646 000
Services provided to others	3 704 000	(409 000)	(11.0)	3 295 000	24 000	0.7	3 319 000	3.9	3 425 000	4.8	3 613 000
TOTAL REGULAR BUDGET	98 680 000	1 709 000	1.7	100 389 000	1 267 000	1.3	101 656 000	3.5	103 899 000	4.8	110 259 000
Less: Miscellaneous income											
Income from work for others	3 704 000	(409 000)	(11.0)	3 295 000	24 000	0.7	3 319 000	3.9	3 425 000	4.8	3 613 000
Other	4 406 000	26 000	0.6	4 432 000	-	-	4 432 000	3.0	4 565 000	3.0	4 702 000
Assessment on Member States	90 570 000	2 092 000	2.3	92 662 000	1 243 000	1.3	93 905 000	3.5	95 909 000	4.9	101 944 000

a/ The increase (decrease) figures shown in this column are affected by adjustments in Common staff costs and Shared support services as explained in para 80 of the Introduction.

THE REGULAR BUDGET

Summary of Income

Table 3

Item	1985 Actuals	1986 Budget	Increase (decrease)	1987 Estimate	Increase (decrease)	1988 Estimate
Assessed contributions on Member States	87 340 000	90 570 000	5 339 000	95 909 000 a/	6 035 000	101 944 000 b/
Miscellaneous income						
(a) Income from work for others						
Data processing services	1 034 926	1 101 000	(102 000)	999 000	54 000	1 053 000
Printing services	1 668 402	1 475 000	(262 000)	1 213 000	70 000	1 283 000
Medical services	352 913	400 000	16 000	416 000	22 000	438 000
Library services	693 975	728 000	69 000	797 000	42 000	839 000
Sub-total	3 750 216	3 704 000	(279 000)	3 425 000	188 000	3 613 000
(b) Attributable to specific programmes						
Publications of the Agency	460 098	510 000	(50 000)	460 000	14 000	474 000
INIS publications including microfiches	385 072	400 000	-	400 000	12 000	412 000
CINDA publications	11 640	18 000	(3 000)	15 000	-	15 000
Advertising	17 004	18 000	-	18 000	1 000	19 000
Laboratory income	164 630	160 000	10 000	170 000	5 000	175 000
Sales of surplus property	5 509	8 000	-	8 000	-	8 000
Amounts recoverable under Safeguards agreements	244 275	250 000	-	250 000	8 000	258 000
UNDP programme support cost	470 730	640 000	130 000	770 000	23 000	793 000
SIDA programme support cost	6 332	-	-	-	-	-
Other programme support cost	-	-	-	-	-	-
Sub-total	1 765 290	2 004 000	87 000	2 091 000	63 000	2 154 000
(c) Not attributable to specific programmes						
Investment and interest income	5 585 552	2 020 000	60 000	2 080 000	62 000	2 142 000
Gain on exchange of currencies	1 917 531	-	-	-	-	-
Other	396 645	382 000	12 000	394 000	12 000	406 000
Sub-total	7 899 728	2 402 000	72 000	2 474 000	74 000	2 548 000
Total miscellaneous income	13 415 234	8 110 000	(120 000)	7 990 000	325 000	8 315 000
TOTAL	100 755 234	98 680 000	5 219 000	103 899 000	6 360 000	110 259 000

a/ Member States contributions will be reduced by their shares in the 1984 cash surplus.
b/ Member States contributions will be reduced by their shares in the 1985 cash surplus.

EXTRABUDGETARY RESOURCES 1985-1988

(as known on 11 July 1986)
a/

Table 4 (excluding contributions in kind)

	1985 Actual Expenditures	1986 b/ Estimate	1987 Estimate	1988 Estimate
Technical Assistance and Co-operation				
Austria	123 270	138 000	[265 000]	-
Belgium	27 116	44 000	-	-
Canada	19 826	38 000	-	-
Chile	-	10 000	-	-
Finland	59 479	27 000	-	-
France	6 002	16 000	-	-
Germany, Federal Republic of	896 017	1 226 000 c/	[500 000]	[500 000]
Italy	4 166 689	7 874 000	[260 000]	-
Japan (RCA)	311 463	353 000	[200 000]	[200 000]
Norway	-	29 000	-	-
Saudi Arabia	-	12 000	-	-
Sweden	118 695	170 000	-	-
Union of Soviet Socialist Republics	1 131 354	1 060 000	[1 056 000]	[1 056 000]
United Kingdom of Great Britain and Northern Ireland	228 293	805 000	[750 000]	[750 000]
United States of America	2 118 817	3 859 000	[1 000 000]	[1 000 000]
Sub-total	9 207 021	15 661 000	[4 031 000] d/	[3 506 000] d/
Nuclear Power				
Small and Medium Sized Power Reactor (SMPR) Study	23 949	6 000	-	-
Nuclear Fuel Cycle				
Germany, Federal Republic of	17 500	-	-	-
NEA/OECD	877	-	-	-
United States of America	15 000	1 000	-	-
Sub-total	33 377	1 000	-	-
Nuclear Safety				
Finland	49 771	86 000	42 000	45 000
United States of America	52 823	76 000	54 000	57 000
Sub-total	102 594	162 000	96 000	102 000
Food and Agriculture				
Australia (RCA)	52 053	78 000	80 000	80 000
Germany, Federal Republic of	73 330	122 000	60 000	60 000
Italy	549 352	241 000	-	-
Japan (RCA)	10 407	13 000	-	-
Netherlands	-	301 000	337 000	351 000
Sweden	258 548	245 000	310 000	310 000
United States of America	11 159	101 000	50 000	50 000
International Consultative Group on Food Irradiation (ICGFI)	18 701	193 000	-	-
Sub-total	973 550	1 294 000	837 000	851 000
Life Sciences				
Japan (RCA)	122 682	252 000	150 000	150 000
United States of America	2 709	50 000	-	-
Sub-total	125 391	302 000	150 000	150 000
Research and Laboratories				
Australia (RCA)	29 648	91 000	-	-
Germany, Federal Republic of	169 644	141 000	4 000	4 000
India (RCA)	-	50 000	50 000	50 000
Italy	92 363	462 000	150 000	-
Japan	-	-	140 000	140 000
United States of America	13 568	127 000	50 000	50 000
Sub-total	305 223	871 000	394 000	244 000

Table 4 (continued)

	1985 Actual Expenditures	1986 b/ Estimate	1987 Estimate	1988 Estimate
International Centre for Theoretical Physics				
Canada	17 661	153 000 e/	-	-
Italy	5 696 253 f/g/	14 316 000 g/	10 500 000	10 500 000
Japan	31 188	33 000	33 000	33 000
Kuwait	79 476	75 000	75 000	75 000
Sweden	100 000	115 000	295 000	295 000
Other	45 345	94 000	95 000	95 000
Sub-total	5 969 923	14 786 000	10 998 000	10 998 000
International Laboratory of Marine Radioactivity				
Denmark	3 864	4 000	3 000	-
Germany, Federal Republic of	41 922	133 000	61 000	-
Principality of Monaco	79 945	80 000	80 000	80 000
United States (National Science Foundation)	26 554	84 000	68 000	2 000
Sub-total	152 285	301 000	212 000	82 000
Safeguards				
Australia	48 285	105 000	80 000	80 000
Canada	345 224	381 000	270 000	270 000
Germany, Federal Republic of	205 967	474 000	300 000	300 000
France	23 065	268 000	100 000	100 000
Italy	-	130 000	150 000	150 000
Japan	31 528	111 000	300 000	100 000
Sweden	48 495	12 000	-	-
Switzerland	22 676	-	-	-
Union of Soviet Socialist Republics	235 544	373 000	100 000	100 000
United Kingdom of Great Britain and Northern Ireland	70 246	127 000	120 000	120 000
United States of America	1 814 073	5 371 000	2 200 000	2 200 000
Sub-total	2 845 103	7 352 000	3 620 000	3 420 000
Administration				
Public Information United States of America	4 698	1 000	-	-
TOTAL	19 743 114	40 737 000	16 307 000	15 847 000

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 and other.
b/ Figures for 1986 represent unobligated balances available 1 January 1986 plus new contributions made and/or expected during 1986. Figures for 1987-88 contain estimates of new funds only.
c/ Includes $42 000 for ARCAL in respect of 1985.
d/ These figures are not included in the total extrabudgetary resources since they are already incorporated in the TC resources shown in Tables 1(a) and 1(b). They represent new contributions in 1987 and 1988.
e/ Represents Canada's contribution of $153 000 in 1986 to the Third World Academy of Sciences.
f/ Represents contributions to the Trieste funds against which expenditures are incurred globally.
g/ Includes Italy's contributions to the Third World Academy of Sciences.

P A R T I

T H E P R O G R A M M E B U D G E T

PROGRAMME AREA 1

NUCLEAR POWER AND THE FUEL CYCLE

Summary of resources by programme

Table 5

Programme	Man-years a/		Planned expenditure for the implementation of the programme in 1987/1988				
	P	GS	Regular Budget estimates	Funds from other UN organizations	TC resources	Other extra-budgetary resources	Total
A. Nuclear Power	53.8	35.4	8 625 000	-	5 707 000	-	14 332 000
SNSP (Net)	a/	a/	327 000	-	-	-	327 000
B. Nuclear Fuel Cycle	23.0	12.0	3 109 000	-	4 502 000	-	7 611 000
C. Radioactive Waste Management	36.0	40.0	5 697 000	-	1 365 000	233 000	7 295 000
SNSP (Net)	a/	a/	396 000	-	-	-	396 000
Programme Area 1	112.8	87.4	18 154 000	-	11 574 000	233 000	29 961 000

a/ Does not include possible additional manpower for the SNSP.

PROGRAMME A: NUCLEAR POWER

Area of Activity A.1
Nuclear Power Planning and Implementation

PROBLEM I

A/1. Need to strengthen national capabilities for planning nuclear power programmes as an integral part of a rational and coherent long-term energy and general development policy.

ASSESSMENT AND ANALYSIS

A/2. The consumption of electricity per capita is relatively low in most developing countries. In many countries, however, because of increasing industrialization and urbanization, the growth rate is high. It has become increasingly important to prepare firm energy policies which cover periods of 20 years or more and are based on planning studies in which energy needs are assessed and all options and alternatives for meeting these needs, including nuclear power, are taken into consideration.

A/3. A nuclear power programme, or even a single nuclear power plant, in a developing country will in every case be a major contributor to the energy and electricity supply of the country, since existing nuclear power plants are large in relation to the total electrical generating capacity in most of these countries. Also, nuclear power programmes require the financing of large, long-term investments. Apart from the economic considerations involved, the nuclear power option carries with it other aspects and requirements which need special attention. A nuclear power programme requires a minimum size of grid, adequate industrial and research infrastructure, manpower resources and so on. This, and the long time required for the preparatory work needed to overcome any constraints, make it essential for nuclear power planning to be integrated with overall energy and general development planning and policies.

A/4. Experience has shown, however, that many developing Member States need assistance in strengthening their national capabilities for long-term energy demand and supply planning and for nuclear power programme planning if they are to be able to consider the nuclear power alternative as a realistic solution in the long term.

A/5. The Agency has identified some 20 countries which have no nuclear power programmes yet but which could initiate such programmes in the short or medium term. These countries require help to develop nuclear power programme plans, to train planning staff and to establish and strengthen infrastructures. In addition, those developing countries which have already launched nuclear power programmes need some assistance in strengthening their capabilities for continuously updating and revising the planning of their programmes.

A/6. There are a further 20 countries or so for which nuclear power will be an option only in the long term, that is after 2010. Their primary need

now is to strengthen their capabilities for long-term planning of their energy demand and supply systems and to identify their long-term infrastructure requirements for a nuclear power programme.

A/7. One major problem facing some of the above developing countries is that the standard plant sizes are too big for their small and weak electricity grids. It is therefore necessary to study the availability of small and medium-sized power reactors and the actual need for such reactors in developing countries.

ROLE OF THE AGENCY

A/8. The Agency has developed a high level of expertise and an integrated set of tools and methodologies such as computer programs for energy demand analysis and electric system expansion planning, guidebooks, manuals and training courses on planning and infrastructure requirements, to assist developing countries with energy planning and all aspects of nuclear power programme planning.

A/9. It is intended to make this set of tools (which will be largely completed by 1988) available to all Member States, and to use it to provide general or direct assistance and advice as appropriate to developing Member States which are at different stages of nuclear power programme planning and implementation. Emphasis will be given to strengthening national capabilities for energy and nuclear power planning.

A/10. Furthermore, as the size of commercially available reactors is of major importance to developing countries, the Agency will, at the request of Member States, continue its efforts to clarify the question of the feasibility of small and medium-sized power reactors for individiual countries.

Project A.1.01

Strengthening capabilities for nuclear power programme planning

A/11. Objective: To strengthen national capabilities for energy, electricity and nuclear power planning in developing countries intending to introduce nuclear power in the near or long term and also in those which have already launched nuclear power programmes.

A/12. Addressee: Energy, electricity and nuclear power planners in government and utility organizations.

A/13. Main means of achieving objective: Meetings, developing and supplying computer models, publishing guidelines, training, supplying experts.

A/14. Project planning and duration: A comprehensive set of planning procedures, including computer programs, data banks, guidebooks and manuals, will be largely completed during 1987 and 1988 and will be made available to all Member States. Updating and revision will be needed after this period.

A/15. Emphasis will be placed on transferring these proven planning methodologies to and strengthening overall planning capabilities in developing

countries which intend in the long term to introduce nuclear power. This will include providing advice on the establishment of organizations for strategic planning. In a broader context, a senior expert group set up in 1986 will study mechanisms for assisting developing countries in promoting nuclear power programmes, including financial aspects. It will complete its work in 1987.

A/16. Two to three interregional, regional or national training courses on planning will be offered each year, providing 75-100 planning staff of some 25 developing Member States with an average of six weeks training in planning procedures.

A/17. Output: Improved awareness and capabilities for energy, electricity and nuclear power programme planning in developing Member States.

Project A.1.02

Development of long-term nuclear power programme plans

A/18. Objective: To develop long-term energy and nuclear power programme plans in up to 10 developing Member States intending to initiate nuclear power programmes in the period 1990-1995.

A/19. Addressee: Energy, electricity and nuclear power planners in government and utility organizations.

A/20. Main means of achieving objective: Transferring methodologies, supplying experts, training, publishing reports.

A/21. Project planning and duration: Requests for assistance in national energy planning and in the preparation of nuclear power programme plans are expected from developing Member States intending to embark upon nuclear power programmes. Depending on the specific situation in individual countries, the requests may include either all or specific elements of a comprehensive analysis. The scope of an individual country project will be defined through detailed preproject planning which will include questionnaires, an assessment of the specific requirements and preparatory missions. 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. By the end of 1988, long-term plans for nuclear power introduction will have been formulated in up to ten developing countries which are intending to initiate nuclear power programmes in the period 1990-95.

A/22. Output: Reports on case studies carried out for the country and a preliminary long-term nuclear power programme plan which will provide a basis for a national decision regarding nuclear power and a basis for drawing up a schedule of follow-up activities in preparation for nuclear power implementation.

Project A.1.03

SMPR case studies for developing countries

A/23. Objective: To determine the feasibility of introducing small and medium power reactors (SMPRs) in developing countries.

A/24. Addressee: Policy makers and authorities in governments and utilities in potential buyer countries, suppliers of SMPRs, financing organizations.

A/25. Main means of achieving objective: Meetings, supplying experts, publishing surveys.

A/26. Project planning and duration: Following the results of the first phase of the SMPR project initiation study, a general study of the constraints affecting the introduction of SMPRs in developing countries will be carried out. It is also planned in the second phase to carry out joint case studies in up to three developing Member States that are considered likely to decide to introduce nuclear power in the period 1990-2000. The studies will involve the potential buyer countries, interested suppliers and the Agency under an interregional technical co-operation (TC) project. They will be based on designs ready for bidding and for different site conditions (sea transport or land transport of components, for example). A case study will include economic and financial analysis, the assessment of infrastructure requirements and identification of possible constraints, the evaluation of possible domestic contributions, a prefeasibility study, a safety review and regulatory requirements. The second phase is to be completed by the end of 1988.

A/27. Output: A report on constraints affecting the introduction of SMPRs in developing countries and reports on case studies for individual countries.

Project A.1.04

Case study for low-temperature nuclear heat application

A/28. Objective: To study the feasibility of using nuclear plants for low-temperature heat supply for district heating and industry in a Member State.

A/29. Addressee: Policy makers and authorities in governments of both the country studied and others, and suppliers of nuclear low-temperature heat plants.

A/30. Main means of achieving objective: Publishing reports, supplying experts.

A/31. Project planning and duration: It is planned to initiate the project in early 1987 and complete it in 1988.A country study will be carried out by national authorities with the assistance of the Agency and information and assistance provided by potential suppliers.

A/32. Output: A report on the country study in late 1988 or early 1989 which should have some general significance.

PROBLEM II

A/33. Need to strengthen the capacity to manage the implementation of nuclear power projects.

ASSESSMENT AND ANALYSIS

A/34. The successful implementation of nuclear power projects requires the performance of a series of tasks and activities effectively supported by national infrastructures which include: organizational structures to plan, take decisions on, execute, operate and regulate nuclear power projects; electricity grids of adequate size and stability; qualified manpower; industrial support for the construction, operation and maintenance of nuclear power plants; a technological and research and development base; and financing.

A/35. About 30 developing countries have either launched nuclear power programmes or intend to initiate their first nuclear power project in the short or medium term. Experience has shown that inadequate infrastructures are a common characteristic of developing countries and might constitute major obstacles to nuclear power project implementation.

A/36. Building up or improving the necessary infrastructure and implementing projects are major tasks in which outside assistance can provide substantial benefits.

ROLE OF THE AGENCY

A/37. General guidelines, approaches and a methodology have been developed by the Agency for implementing nuclear power projects and for identifying the infrastructure requirements, surveying the existing national infrastructures, locating the specific areas in need of development or improvement, and establishing national infrastructure development programmes. This guidance is contained in a comprehensive set of technical guidebooks and other publications, some of which are already available to Member States. The remainder will be largely completed by 1988 and will then require to be continuously updated and improved and possibly supplemented.

A/38. Applying this general guidance in particular countries and specific situations requires experience and technical know-how which might not be readily available locally. The Agency can provide technical assistance in this endeavour, at Member States' request.

A/39. In addition, the Agency can also provide assistance with the implementation of nuclear power project tasks and activities, the assessment of infrastructures and the implementation of infrastructure development programmes in individual countries. This will be done through Agency and UNDP technical co-operation projects.

Project A.1.05

Dissemination of information on and guidelines for nuclear power implementation

A/40. Objective: To provide developing Member States which already have nuclear power programmes or are planning to introduce such programmes in the short, medium or long term with authoritative information on the effective implementation of nuclear power projects and on the supporting infrastructure development requirements.

A/41. Addressee: National authorities, management and staff of utilities and organizations involved in nuclear power.

A/42. Main means of achieving objective: Publishing guidebooks, training.

A/43. Project planning and duration: The preparation of a comprehensive set of technical guidebooks has been under way for some years. Nine guidebooks have been published. Seven more are at various stages of preparation and will be completed by 1988. The later ones will focus on education and training requirements, including continuing in-career education. It will be necessary to continuously update, review and complement these guidebooks.

A/44. One to two 6-week interregional training courses will be organized each year.

A/45. Output: Increased capability to manage the implementation of nuclear power progammes.

Project A.1.06

Project feasibility studies and infrastructure development planning in individual countries

A/46. Objective: To determine the feasibility of implementing nuclear power in individual developing Member States and to provide guidance to those States on the overall planning of the necessary infrastructure, with emphasis on organizational structures and manpower development.

A/47. Addressee: Management and staff of utilities, national authorities and organizations involved in nuclear power programmes.

A/48. Main means of achieving objective: Supplying experts, training.

A/49. Project planning and duration: During the period 1987-88, some 20 developing Member States will receive individual advice and assistance - through TC projects - on nuclear power project and infrastructure development planning. This will include assistance in two to four feasibility studies for nuclear power projects. About two years is the normal duration of a feasibility study.

A/50. Output: Basis for national decisions on the implementation of nuclear power projects and on infrastructure development.

Project A.1.07

Strengthening capabilities in project execution

A/51. Objective: To provide support for developing Member States with existing nuclear power projects or launching their first projects in strengthening their national infrastructure and in performing the work required to implement nuclear power projects, with emphasis on bid specifications, bid evaluations, project management and training of management personnel.

A/52. Addressee: Utility management and staff, industry involved in nuclear power projects, educational, training and research and development centres and institutes.

A/53. Main means of achieving objective: Supplying experts, training.

A/54. Project planning and duration: Assistance will be provided to some 10 developing Member States with existing nuclear power projects, with particular attention being paid to those States which are launching their first projects. Comprehensive multi-year manpower development projects (financed through Agency TC and UNDP) are planned. About six national courses will be organized annually.

A/55. Output: Enhanced ability to implement nuclear power projects.

Area of Activity A.2
Technical and Economic Performance of Nuclear Power

PROBLEM I

A/56. Member States need access to a worldwide body of selected information on the technical performance of nuclear power plants in order to assist them in making improvements in this area.

ASSESSMENT AND ANALYSIS

A/57. Information collected and analysed by the Agency has shown large variations in plant operating availability and construction times. These factors have a considerable influence on electricity generating costs.

A/58. The Agency has already identified several general factors as being important for plant operating performance. These include: the degree of plant standardization; quality assurance measures during design, construction and operation; the competence and skill of managers and personnel responsible for plant operation; and the regulatory climate. There are a number of additional factors which can have a long-term influence on the performance of nuclear power plants - for example, phenomena influencing the degradation of plant equipment quality and new developments in technology which may contribute to improved component reliability or operational effectiveness.

A/59. Improvements in plant construction and performance can be achieved by understanding all the relevant factors and identifying the necessary remedial actions.

ROLE OF THE AGENCY

A/60. The Agency can contribute to the improvement of the technical and economic performance of nuclear power plants by collecting and analysing information on nuclear power plant operating experience and identifying factors influencing plant performance; disseminating information on plant peformance and analysis, stressing those areas of information which are not available through other channels; enhancing the exchange of information on new developments in the design, construction and use of equipment in nuclear power plants which help improve plant availability; and collecting and analysing good practices in plant construction management, quality assurance, training and qualification of personnel and so on, and publishing guidebooks and manuals.

A/61. Although the primary objective of these activities is to promote better plant availability, many will also serve to improve safety.

Project A.2.01

Nuclear power plant performance analysis

A/62. Objective: To provide information on those factors which are important for achieving good performance in plant construction and operation through analysis of empirical data.

A/63. Addressee: Nuclear power plant owners, operators and planners in government and utility organizations.

A/64. Main means of achieving objective: Maintaining a data base, publishing reports, holding meetings.

A/65. Project planning and duration: The main tool is the Agency's Power Reactor Information System (PRIS) which in 1985 contained information on basic performance parameters from more than 2800 reactor years and short descriptions of more than 17600 plant outages. This information will continue to be made available in annual publications and will also be analysed to identify factors which influence performance and trends which could become important in the long term (in connection with plant ageing, for example) and which have general significance for plant technology.

A/66. Harmonization of report parameter definitions and formats has already been attained with CEC, UNIPEDE and WEC and efforts to achieve the same with utility organizations in North America (EEI, INPO, NERC) will continue.

A/67. Special data sets are provided to PRIS participants in response to requests. Demand for this service has shown a marked increase, growing to some 40 requests in 1985.

A/68. Work on a new analytical approach to rationalize performance data was initiatied in 1984 and is expected to be completed in 1989. This will be used in the new format for publishing annual performance data sets.

A/69. Analytical work based on information collected from missions to nuclear power plants and aimed at defining major factors responsible for variations in performance should be completed by 1987.

A/70. A conference on nuclear power performance and safety will be organized in 1987 (jointly with Project A.2.05).

A/71. Output: Regular access to comprehensive data and information on plant performance throughout the world.

Project A.2.02

Assessment of and exchange of information on nuclear power plant performance

A/72. Objective: To provide information relevant to the improvement of nuclear power plant system performance and the extension of plant lifetime.

A/73. Addressee: Nuclear power plant owners, designers, equipment manufacturers and inspection organizations.

A/74. Main means of achieving objective: Meetings (International Working Group (IWG) on Reliability of Reactor Pressure Components and IWG on Nuclear Power Plant Control and Instrumentation), supporting research and development.

A/75. Project planning and duration: Two subjects were selected for detailed investigation through CRPs: one is the optimization of steel irradiation embrittlement surveillance programmes and the other is approaches to training simulator modelling. These will be completed by 1988.

A/76. Under the two IWGs, information exchange activities conducted through four annual specialists' meetings will be expanded to cover those areas relating to mechanical components and systems or electrical, instrumentation and control components and systems which experience has shown to have been sources of plant unavailability. Improved QA in the non-nuclear parts of plants will be promoted. It is expected that new topics for co-ordinated research not supported by other organizations will be prepared as a result of this development. A CRP will examine the question of steel embrittlement and its importance for plant lifetime assessment and extension. This subject will be studied in greater depth in specialists' meetings organized in co-operation with NEA.

A/77. Output: Saving in research resources by co-ordinating investigation of selected topics.

PROBLEM II

A/78. Member States need guidance and assistance in establishing QA programmes for nuclear power plant performance and safety.

ASSESSMENT AND ANALYSIS

A/79. The Agency has issued the NUSS code and guides for QA for thermal nuclear power plants. These have been adopted wholly or partly as national regulations in a large number of Member States. Experience shows that both general and specific guidance is needed on the practical application of regulatory texts.

ROLE OF THE AGENCY

A/80. The guidance needed can be supplied through the publication of manuals and the provision of training. The Agency is in practice the only international organization working in this field and therefore has particular responsibility for the sound application of QA procedures and practices in developing Member States with nuclear power programmes.

A/81. No satisfactory answer has yet been found to the question of what cost benefits good QA standards bring. Methods of measuring the effectiveness of QA in improving plant performance and safety could provide a better basis for major decisions on plant construction and operation and also an incentive for the broader application of QA standards. With the experience it has accumulated, the Agency is well placed to guide such a study.

Project A.2.03

Strengthening capabilities in quality assurance programmes

A/82. Objective: To assist owner and regulatory organizations in Member States to establish and execute QA programmes for all stages of nuclear power projects.

A/83. Addressee: Nuclear power plant owners, regulatory bodies, inspection organizations and manufacturing industries.

A/84. Main means of achieving objective: Publishing manuals, supplying experts, training.

A/85. Project planning and duration: The NUSS QA code and guides were completed in 1985. A series of six QA manuals will have been completed by 1986. A further three will be prepared in 1987 and 1988, focusing on aspects such as the handling of cases of non-conformance and interfaces between the QA and other safety areas.

A/86. One interregional training course and three to five national courses will be held annually. About 10 TC projects will be under implementation.

A/87. Output: Enhanced expertise in the implementation of QA programmes.

Project A.2.04

Quantification of the effectiveness of QA in improving plant performance and safety

A/88. Objective: To define general parameters and methods which can be used in evaluating the effectiveness of QA programmes in improving plant performance and safety.

A/89. Addressee: Nuclear power plant owners, regulatory organizations.

A/90. Main means of achieving objective: Meetings, publishing a report.

A/91. Project planning and duration: A study co-ordinated by the Agency and based on Member States' experience will be conducted in 1987 and 1988.

A/92. Output: Internationally produced basis for evaluating the effectiveness of QA.

PROBLEM III

A/93. Member States need access to a worldwide body of information on the economic performance of nuclear power plants and on measures which can improve performance.

ASSESSMENT AND ANALYSIS

A/94. Experience from nuclear power plants in operation clearly shows that in general their economic performance is good. However, nuclear power plant investment costs, which account for 50-80% of the total cost of nuclear-generated electricity, have been rising sharply almost everywhere. Steps need to be taken to stabilize or, better still, to reduce construction costs and to increase the operational availability.

A/95. Experience and analyses show that stable regulatory requirements, good project management and plant standardization, together with mutliple-unit sites, can have a significant effect on controlling and reducing investment costs.

A/96. In order to improve nuclear power generating costs, many countries are also making a serious effort to achieve better technical performance through improved operation, refuelling, maintenance and repair schemes. Since a one-day outage of a 1000 MW(e) nuclear power plant can represent a revenue loss of US$ 0.5-1.0 million, the economic benefit of reducing plant downtime is obvious.

ROLE OF THE AGENCY

A/97. The Agency can contribute to the improvement of the economic performance of nuclear power by collecting and analysing information on the

economic performance of nuclear power plant construction and operation and identifying factors influencing the cost of electricity production by nuclear power plants; disseminating information on worldwide experience regarding the economic performance of nuclear power, stressing those areas of information not available through other means; and promoting the exchange of information on new ways of improving the economics of nuclear power plant construction and operation.

A/98. Although the primary objective of these actions is to promote an improvement in the economic performance of nuclear power plants, many will also serve to improve technical performance.

Project A.2.05

Nuclear power plant economic analysis

A/99. Objective: To 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.

A/100. Addressee: Nuclear power plant owners, operators and planners in government and utility organizations.

A/101. Main means of achieving objective: Meetings, publishing reports and surveys, supplying experts.

A/102. Project planning and duration: Studies on the construction, operation and fuel costs of nuclear, coal-fired and oil-fired power plants should essentially be completed by 1988, providing a reference cost data base for use in nuclear power planning studies in developing countries. These reference data will be revised in cases where actual cost experience is available. A conference on nuclear power performance and safety will be held in 1987 (jointly with Project A.2.01).

A/103. Output: Information which will serve as a basis for improving the economic performance of nuclear power plants.

Area of Activity A.3
Advanced Systems and Technology Development

PROBLEM I

A/104. Need to consolidate and improve nuclear power technology in order to ensure, in the long term, better utilization of nuclear energy resources.

ASSESSMENT AND ANALYSIS

A/105. Work on major improvements in nuclear power is currently under way with objectives that range from reducing plant construction costs in the near term to increasing energy resource utilization in the long run. These objectives are being pursued for different power systems including sodium-cooled fast reactors, high temperature reactors and new light and heavy water reactor concepts as well as for applications other than electricity generation.

A/106. Each of these systems has the potential to become a viable option for the nuclear technology programmes of Member States. If this is to be achieved, however, it will be essential to consolidate the broad basis of technology established over the past decades in many countries and to facilitate access to these technologies when needed. In addition, it will be necessary to focus all available development resources on improving designs and related technologies especially in the vital areas of cost reduction, better fuel and resource utilization, simplification of construction and operation, inherent safety and the expanded industrial and non-industrial applications of nuclear heat.

ROLE OF THE AGENCY

A/107. The Agency can provide a global forum for the exchange of information in this area and can co-ordinate more ambitious forms of co-operation among States. It will conduct periodic reviews of the status of national programmes through international working groups, enable Member States to exchange experience in the key priority development areas and co-ordinate joint research and development programmes. In addition, it can provide direct technical guidance and advice to Member States starting or intending to start exploratory programmes.

Project A.3.01

Exchange of information on the improvement of reactor technologies for better resource utilization

A/108. Objective: To promote effective information exchange and to provide guidance and support to developing countries initiating programmes in this field.

A/109. Addressee: Atomic energy authoritites in Member States.

A/110. Main means of achieving objective: Holding meetings (IWGs on Fast Breeder Reactors and on High Temperature Reactors), supporting research and development, publishing reports, supplying experts.

A/111. Project planning and duration: Work under the project is mainly carried out through the IWG on Fast Breeder Reactors and over 80 specialists' meetings have been convened to date. At present, studies on the characterization of abnormal system behaviour of FBRs are being conducted. In 1987 and 1988, emphasis will be given to cost reduction and extended life of components including fuel, as was recommended at a symposium on FBR experience and trends in 1985.

A/112. In the area of advanced converters (LWR, HWR), a review has been carried out by a technical committee to identify areas where R&D is needed to improve the present technology and enhance the utilization of energy resources. In 1987-88, specialists' meetings will be held to exchange information on, and assess, the potential of advanced converter concepts in reactor technology.

A/113. Output: Better understanding of the means of achieving, and of the limitations on, the improvement of nuclear fuel resource utilization.

Project A.3.02

Assessment of the development of "simple, cheap and safe" reactor concepts

A/114. Objective: To provide a forum for the exchange of information on, and to assess the development of, reactor designs which will simplify construction and operation, reduce costs and enhance safety.

A/115. Addressee: Atomic energy authorities, reactor manufacturers and utilities.

A/116. Main means of achieving objective: Meetings, publishing documents.

A/117. Project planning and duration: Several countries are starting development work on reactor types which offer potential advantages in that they are less sophisticated, less expensive and are likely to lead to wider acceptance of nuclear power in both industrialized and developing Member States. This project was initiated in 1985, and expert meetings have been held in 1985 and 1986. In 1987-88, it is planned to review the technical requirements of existing or planned development programmes on these new reactor concepts and to make an assessment of the future potential and prospects for such a reactor.

A/118. Output: Information on the status of a new type of reactor that will be safer and more competitive economically, and can be utilized by a wider range of Member States.

Project A.3.03

Exchange of information on nuclear heat applications

A/119. Objective: To provide a technical exchange forum and to encourage technology development and expanded international co-operation on reactor concepts which have the potential to provide, besides electricity, high temperature process heat or steam for various industrial applications.

A/120. Addressee: Governmental and industrial organizations interested in the potential of nuclear power for heat production.

A/121. Main means of achieving objective: Meetings (IWG on Gas-Cooled Reactors), publishing reports, supporting research and development.

A/122. Project planning and duration: Progress in high temperature reactors and their applications is reviewed by the IWG on Gas-Cooled Reactors once every two years and over 15 specialists' meetings have so far been convened on topics covering safety and technological aspects. The trend at present is towards the development of small high-temperature gas-cooled reactors with potential applications in district heating, process heat, oil extraction and so on. In 1987-88, efforts will focus on the exchange of information on the development of high temperature structural materials for process heat applications and a related CRP will be initiated. A major international symposium on high-temperature gas-cooled reactor applications is foreseen for the period 1989-90.

A/123. Output: Access of Member States to information on the latest developments in nuclear heat applications.

PROBLEM II

A/124. Development of nuclear fusion.

ASSESSMENT AND ANALYSIS

A/125. The scientific feasibility of fusion power is expected to be demonstrated by the operation of large tokamak experiments that are now at an advanced stage of construction or are already in operation. The next major step towards fusion power reactors will be the demonstration of technical and engineering feasibility. A number of major problems remain to be overcome in technological areas associated with operation at high power levels, high structural temperatures, high radiation levels and a closed radioactive fuel cycle. While these problems are not as new as plasma confinement, finding practical solutions remains complex and costly and requires extensive joint international efforts in research and development programmes on fusion reactor engineering and technology, including a worldwide exchange of information.

ROLE OF THE AGENCY

A/126. As an international organization with worldwide membership, the Agency can play an active role in fusion development by offering a forum for the exchange of experience on key development areas and for the periodic review of the status of national programmes and by co-ordinating joint research and development programmes.

A/127. The INTOR project is an example of such co-operation. In providing the administrative framework for this venture, the Agency brings the scientific expertise of the whole international fusion community to bear on this problem. This enables a consensus to be achieved on the various critical issues facing the experiment and focuses efforts on a single design rather than on the four different approaches that would otherwise result.

A/128. In carrying out these activities, the Agency is advised by the International Fusion Research Council (IFRC) appointed by the Director General.

Project A.3.04

International tokamak reactor study

A/129. Objective: To provide the conceptual design for the next generation large tokamak experiment, to examine the critical issues facing its construction, and to generate new and innovative ideas that would make the tokamak the basis for an eventual fusion reactor.

A/130. Addressee: Governments, in the first instance in the major industrialized Member States.

A/131. Main means of achieving objective: Meetings.

A/132. Project planning and duration: The INTOR study is carried out through workshop meetings about twice a year. The major part of the work is, however, performed in the home laboratories of the participating countries: the European Community, Japan, USA and USSR. The two previous stages of the INTOR study concerned the conceptual design of the next large tokamak facility. During the present phase, which will be completed by the end of 1987, the main emphasis is on innovation and its consequences in the light of the requirements for an eventual demonstration power plant. It is expected that the workshop will continue its work beyond 1987.

A/133. Output: Availability of conceptual design information at lower cost to individual countries and with less effort on their part.

Project A.3.05

Exchange of information on fusion research and engineering

A/134. 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/135. Addressee: Research and development institutes with substantial programmes in fusion technologies and plasma physics.

A/136. Main means of achieving objective: Meetings, publishing reports, supplying experts and equipment, training, supporting research and development.

A/137. Project planning and duration: The activities of this project are continuously reviewed by the IFRC which assists the Agency in identifying key priority areas for research. During the period 1987-88, the project will focus on engineering and maintenance aspects of future fusion power systems. Several specialists' meetings will be convened. In 1988 the Twelfth International Conference on Plasma Physics and Controlled Nuclear Fusion will be organized. The publication of the journal "Nuclear Fusion" will continue to be a major activity.

A/138. Output: Improved understanding of the problems facing the implementation of fusion technology and strengthened capability in plasma physics.

Summary of budget estimates by Area of Activity

Table 6

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
A.1. Nuclear Power Planning and Implementation	1 498 000	(28 000)	(1.9)	1 470 000	(32 000)	(2.2)	1 438 000	3.1	1 515 000	4.9	1 555 000
A.2. Technical and Economic Performance of Nuclear Power	1 066 000	185 000	17.4	1 251 000	(68 000)	(5.4)	1 183 000	3.2	1 291 000	4.9	1 281 000
A.3. Advanced Systems and Technology Development	1 277 000	110 000	8.6	1 387 000	36 000	2.6	1 423 000	3.5	1 436 000	5.0	1 547 000
SNSP (Net)	-	135 000	-	135 000	37 000	27.4	172 000	3.5	140 000	4.8	187 000
Programme A Total	3 841 000	402 000	10.5	4 243 000	(27 000)	(0.6)	4 216 000	3.3	4 382 000	4.9	4 570 000

Summary of main means by Area of Activity

Table 7

Area of Activity	Man-years a/ P	Man-years a/ GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	SNSP (Net) b/	TC support & advisory services	Total	Responsible Division
	1987/1988 Estimates (Regular Budget)											
A.1. Nuclear Power Planning and Implementation	22.6	13.4	-	420 000	1 030 000	-	-	90 000	-	1 530 000	3 070 000	NENP
A.2. Technical and Economic Performance of Nuclear Power	15.4	8.6	152 000	620 000	1 320 000	-	-	200 000	-	280 000	2 572 000	NENP
A.3. Advanced Systems and Technology Development	8.0	4.0	-	-	690 000	-	-	460 000		28 000	1 178 000	NENP
	3.8	1.4	114 000	-	310 000	-	-	170 000	-	30 000	624 000	RIRL
	4.0	8.0	-	111 000	1 070 000	-	-	-	-	-	1 181 000	NESI
Supplementary Nuclear Safety Programme (SNSP) (Net)	a/	a/	-	-	-	-	-	-	327 000	-	327 000	NENP
Programme A Total	53.8	35.4	266 000	1 151 000	4 420 000	-	-	920 000	327 000	1 868 000	8 952 000	

a/ Does not include possible manpower for the supplementary nuclear safety programme.

b/ The "main means" of implementing the SNSP have not yet been decided.

Programme Area 1: List of projects and estimated resources for 1987/1988

Table 8

	Project		Estimated Resources for 1987/1988 Regular Budget	TC resources	Extra-budgetary resources a/	Total
Programme A	NUCLEAR POWER					
Area of Activity						
A.1.	Nuclear Power Planning and Implementation					
A.1.01	Strengthening capabilities for nuclear power programme planning		940 000			
A.1.02	Development of long-term nuclear power programme plans		690 000			
A.1.03	SMPR case studies for developing countries		370 000			
A.1.04	Case study for low-temperature nuclear heat application		135 000			
A.1.05	Dissemination of information on and guidelines for nuclear power implementation		235 000			
A.1.06	Project feasibility studies and infra-structure development planning in individual countries		230 000			
A.1.07	Strengthening capabilities in project execution		470 000			
A.1.	Sub - Total		3 070 000	4 250 000	-	7 320 000
A.2.	Technical and Economic Performance of Nuclear Power					
A.2.01	Nuclear power plant performance analysis		922 000			
A.2.02	Assessment of and exchange of information on nuclear power plant performance		500 000			
A.2.03	Strengthening capabilities in quality assurance programmes		390 000			
A.2.04	Quantification of the effectiveness of QA in improving plant performance and safety		65 000			
A.2.05	Nuclear power plant economic analysis		695 000			
A.2.	Sub - Total		2 572 000	1 405 000	-	3 977 000
A.3.	Advanced Systems and Technology Development					
A.3.01	Exchange of information on the improvement of reactor technologies for better resource utilization		528 000			
A.3.02	Assessment of the development of "simple, cheap and safe" reactor concepts		290 000			
A.3.03	Exchange of information on nuclear heat applications		200 000			
A.3.04	International tokamak reactor study	RIRL	200 000			
A.3.05	Exchange of information on fusion research and engineering	RIRL	424 000			
		NENP	160 000			
		NESI	1 181 000			
A.3.	Sub - Total		2 983 000	52 000	-	3 035 000
	SNSP (Net)		327 000	-	-	327 000
Programme A	Nuclear Power		8 952 000	5 707 000	-	14 659 000

a/ Includes funds from other UN organizations.

PROGRAMME B: NUCLEAR FUEL CYCLE

Area of Activity B.1
Resources and Supply of Uranium and Thorium

PROBLEM I

B/1. Need for a comprehensive picture of world nuclear fuel resources in various economic and geological categories and of future deliverable supply.

ASSESSMENT AND ANALYSIS

B/2. A comprehensive knowledge of nuclear fuel resources and their availability and economics is a prerequisite for the sound planning of energy and nuclear programmes and for the timely development and deployment of reactor and fuel cycle technologies. The intensive search for uranium in the last few decades has produced an enormous amount of data on the location, characteristics and geological setting of world uranium deposits and occurrences. This information can provide the keys to understanding the nature of the formation of uranium deposits and the settings in which future exploration would be most productive. In order to make this information available to Member States, a computer-based information system (INTURGEO) has been developed by the Agency.

ROLE OF THE AGENCY

B/3. Over the years the Agency has developed the means to define, gather, analyse and publish information on nuclear fuel resources and related geological information and is widely recognized as an authoritative source of such information.

Project B.1.01

Collection, evaluation and maintenance of data on world nuclear fuel resources and related geological information

B/4. Objective: To maintain and improve the quality and coverage of estimates of world nuclear fuel resources and supply and to make information available in a useful, timely and regular manner.

B/5. Addressee: Government policy makers and energy planners, utilities, research and development organizations, reactor and fuel cycle equipment and service suppliers, mining and exploration organizations.

B/6. Main means of achieving objective: Maintaining a data base, meetings, publishing reports.

B/7. Project planning and duration: 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 1987). A manual on procedures for the estimation of additional and speculative resources will

be completed in 1987. An assessment on geological grounds of additional potential resources and the identification of geologically favourable areas for exploration will be completed in 1988. Four regional reports on uranium resources and geology will be prepared. Uranium supply and demand analyses will be carried out periodically in co-operation with NEA and reports on these topics will be prepared.

B/8. Output: Authoritative information on nuclear fuel resources and supply in the near and long term for use in the planning of nuclear programmes. Comprehensive information on world uranium deposits and occurrences and their environments for use as a basis for exploration and resource assessment.

Project B.1.02

Exchange of information on uranium and thorium geology, exploration and mining

B/9. Objective: To gather, exchange, and report current information on technology and developments in uranium geology, exploration, resource evaluation and production.

B/10. Addressee: Government and private uranium exploration and production organizations.

B/11. Main means of achieving ojective: Meetings, publishing reports.

B/12. Project planning and duration: Work will concentrate on individual aspects of the technology or will be organized on a regional basis, focusing on the characteristics and problems of particular areas of the world. In 1987-1988 reports on uranium geology will be prepared covering aspects of deposit formation, deposit characteristics and environments, weathering and geochemical dispersion (particularly in tropical and desert settings) and implications for exploration. A study will be carried out on the characteristics and recognition of environments favourable for uranium deposits. A report on geological data interpretation, processing, analysis, integration and display will be drawn up.

B/13. Output: In-depth information on aspects of uranium geology and technology for use in exploration, assessment and production programmes.

PROBLEM II

B/14. Need to transfer to developing countries the methodology for and technical approaches to uranium exploration and resource development.

ASSESSMENT AND ANALYSIS

B/15. There continues to be a high level of interest in work on uranium exploration and resource evaluation in developing countries, but limited capability. Some 30 requests for TC projects are received each year and most countries need assistance in a wide variety of matters from basic prospecting and exploration to deposit development and production.

ROLE OF THE AGENCY

B/16. Because of the experience and expertise it has gained in this sphere over the years, developing countries look to the Agency for assistance and information in this field.

Project B.1.03

Provision of assistance to specific developing Member States in strengthening their capabilities and capacities regarding uranium exploration, assessment and ore production

B/17. Objective: To develop and strengthen Member States' ability to perform uranium exploration, assessment and production activities.

B/18. Addressee: Uranium exploration and production organizations.

B/19. Main means of achieving objective: Publishing reports, supplying experts and equipment, training.

B/20. Project planning and duration: Work on four manuals will continue during the period 1987-88, covering specific aspects of exploration practice and analytical techniques and of mining techniques and practice. Some 30-40 TC projects will be carried out during this period. Efforts will be made to establish worldwide calibration facilities to support exploration and exploitation activities; reference materials for geochemical analysis will be prepared. Training courses on exploration will be held annually.

B/21. Output: Improved capability of developing countries to carry out uranium exploration, ore deposit development and uranium production.

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

PROBLEM I

B/22. Need to develop and optimize uranium (thorium) ore processing and reactor materials production capabilities in Member States

ASSESSMENT AND ANALYSIS

B/23. Many Member States are interested in producing uranium concentrates and nuclear materials other than fuel (heavy water and reactor materials, for example). The introduction, development and optimization of these activities require long-term decisions to be taken in the context of the nuclear power programme envisaged by countries. For this purpose specific information and expertise is needed which is not readily available to individual developing Member States.

ROLE OF THE AGENCY

B/24. As an organization with a worldwide membership, the Agency is in a position to collect, collate and disseminate information on fuel cycle technology and activities from all parts of the world.

Project B.2.01

Exchange of information on the status of and trends in nuclear and reactor materials production and processing technology and on nuclear fuel cycle facilities throughout the world

B/25. 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/26. Addressee: Ministries of energy and mines, atomic energy commissions, metallurgical and other research institutions, uranium producers, regulatory authorities, planners, designers and operators of nuclear fuel cycle facilities.

B/27. Main means of achieving objective: Meetings, publishing reports, maintaining a data base.

B/28. Project planning and duration: In 1987-88, reports on uranium extraction technology and on Zircaloy production and performance will be published. In addition, on the basis of the Nuclear Fuel Cycle Information System (NFCIS), which is a computerized data base, a hard-copy directory of nuclear fuel cycle facilities will be updated and published every two years, the first issue appearing in 1987.

B/29. Output: Improved ability to produce fuel and nuclear material.

Project B.2.02

Provision of guidance on the establishment and development of nuclear and reactor materials production and processing activities in developing countries

B/30. Objective: To provide assistance to developing countries in the planning and implementation of nuclear fuel cycle activities and in the production of uranium concentrates, nuclear materials (including materials other than fuel) and reactor materials.

B/31. Addressee: Ministries of energy, atomic energy commissions, uranium producers, planners, designers and operators of nuclear fuel cycle facilities.

B/32. Main means of achieving objective: Publishing guidebooks, supplying experts and equipment, training.

B/33. Project planning and duration: Assistance to specific developing countries will be provided under the TC programme and will include a training course. Manuals on pilot plant techniques, on analytical methods for nuclear materials exploration, development and mining and on the economic evaluation of uranium production projects will be completed in 1987-88.

B/34. Output: Improved capability of developing countries to establish and carry out ore processing and nuclear and reactor materials production projects.

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

PROBLEM I

B/35. Need to improve the design, fabrication, quality control and operating performance of reactor fuel

ASSESSMENT AND ANALYSIS

B/36. The safe and economic operation of nuclear power plants depends to a large extent on the quality and performance of fuel elements. While current performance is satisfactory, it is necessary to improve fuel design and utilization in order to meet the requirements for increased burn-up and reliability that have arisen as a result of the operation of nuclear power plants under load following conditions.

ROLE OF THE AGENCY

B/37. Through international co-operation, research resources and efforts can be shared and optimized. To this end, the Agency can provide a forum for the exchange of information and can also provide direct assistance to developing countries.

Project B.3.01

To enhance international co-operation in the improvement of nuclear reactor fuel design, fabrication, utilization and performance

B/38. Objective: To serve as a forum for the exchange of information on fuel performance behaviour and reliability during operation.

B/39. Addressee: Energy policy-makers, research institutes, applied technology institutes, domestic fuel fabrication facilities, safety research institutes, licensing authorities.

B/40. Main means of achieving objective: Meetings (IWG on Water Reactor Fuel Performance and Technology), supporting research, training, supplying experts, publishing reports.

B/41. Project planning and duration: In the period 1987-88, a co-ordinated research programme will be initiated with the objective of improving the corrosion behaviour of reactor materials and water chemistry. Advanced fuel technology and performance activities will centre on the co-ordination of studies on the improvement of fuel fabrication technology and the implementation of new technological processes, the development of improved fuels including Gd-doped fuels for PWRs and BWRs, FBR and HTGR fuels for high burn-up operation, the effect of improved fuels on fuel cycle economics and the problems created by improved fuels for the back end of the nuclear fuel cycle.

B/42. During the period 1987-1991, reports will be prepared on aspects of physicochemical mechanisms of corrosion and environmental degradation, corrosion product build-up mechanisms, the influence of radiation effects on material resistance and the main criteria for selecting structural materials. A seminar will be held in 1988.

B/43. Output: More efficient organization of research, development and production programmes in Member States.

Area of Activity B.4
Spent Fuel Management

PROBLEM I

B/44. Need to develop and optimize spent fuel management technology.

ASSESSMENT AND ANALYSIS

B/45. The problem of developing and optimizing spent fuel management technology can be divided into three main areas. The first is interim spent fuel storage, which for many Member States represents the main solution to the problems of the back end of the nuclear fuel cycle. A knowledge of spent fuel behaviour under long-term wet and dry storage conditions and of the design, licensing and operation of storage facilities is needed for the planning of nuclear programmes. The second relates to the reprocessing of spent fuel which is not only a means of extracting and then re-using fissile materials (U, Pu) but a potential source of several noble metals and of radioisotopes for radiation technology. Thirdly, there is a need for reliable and inexpensive construction materials for nuclear installations in the intermediate and back-end stages of the nuclear fuel cycle. In particular, the corrosion resistance and mechanical properties of existing materials need to be substantially improved in order to meet requirements.

ROLE OF THE AGENCY

B/46. In view of its experience and international membership, the Agency is the appropriate body to collect and analyse information on spent fuel arisings and storage requirements and to provide a forum for the exchange of information on spent fuel storage experience and innovations in spent fuel storage technology.

Project B.4.01

Evaluation of information on spent nuclear fuel arisings and capacity requirements

B/47. Objective: To collect, evaluate and analyse information on spent fuel storage requirements and fuel discharges world wide.

B/48. Addressee: National atomic energy commissions, governmental licensing authorities, operators of nuclear power plants and spent fuel storage facilities, planning bodies in the nuclear industry.

B/49. Main means of achieving objective: Meetings, publishing reports, maintaining a data base.

B/50. Project planning and duration: Efforts in 1987-88 will focus on the evaluation of storage needs in Member States and on the economics of spent fuel storage. The results will be published in a technical document on spent fuel management and in a survey on world wet and dry spent fuel storage.

B/51. Output: Comprehensive information on current and future spent nuclear fuel arisings and capacity requirements as a basis for the planning of national spent fuel storage strategies.

Project B.4.02

To enhance international co-operation in the selection of spent fuel storage options and practices

B/52. Objective: To exchange new experimental, theoretical and operating information on the safe storage of spent nuclear fuel and to provide assistance to individual developing countries.

B/53. Addressee: National atomic energy commissions, governmental licensing authorities, operators of nuclear power plants and spent fuel storage facilities, planning bodies in the nuclear industry, research organizations.

B/54. Main means of achieving objective: Meetings, publishing reports and guides, training, supporting research, maintaining a data base, supplying experts.

B/55. Project planning and duration: Efforts in 1987-88 will focus on the analysis of the design and operation of wet and dry spent fuel storage facilities with four technical documents being published. A training course on spent fuel storage will be conducted in 1988. A CRP will deal with the development of reliable and cheap structural materials for back end facilities. In co-operation with NEA, a symposium on strategy and options for the back end of the nuclear fuel cycle will be organized in 1987.

B/56. Output: Increased technical expertise in the establishment and implementation of national spent fuel storage programmes, including the selection of the type of storage and safe storage periods.

Project B.4.03

Exchange of information on spent fuel treatment,the recycling of fissile materials and the recovery and utilization of other valuable elements

B/57. Objective: To collect, evaluate and compile information on the methodology for re-using fissile materials and on world needs for noble metals and radioactive sources for radiation technology and to evaluate the existing and potential quantity of noble metals, Cs and Sr in reprocessed high-level waste.

B/58. Addressee: National atomic energy commissions, planning bodies in the nuclear industry, research organizations, consumers of noble metals, radioactive isotopes and fissile materials.

B/59. Main means of achieving objective: Meetings, publishing reports.

B/60. Project planning and duration: Work will concentrate on analysing information on methodological and technological approaches to the recovery of valuable elements from radioactive waste and on the economics of the recovery of valuable elements and the recycling of fissile materials, including their impact on fuel cycle costs. In 1987 and 1988, technical documents reviewing the status of the use of mixed oxide fuels in LWRs, remote technology in fuel fabrication involving recycled fissile materials, and noble metal, Sr and Cs arisings and demand will be prepared.

B/61. Output: Improved knowledge of the utilization of recycled fuels in Member States with established nuclear power programmes. In-depth information on remote technology for fuel fabrication and refabrication and on the recovery and utilization of valuable non-fissile elements.

Summary of budget estimates by Area of Activity

Table 9

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
B.1. Resources and Supply of Uranium and Thorium	495 000	(49 000)	(9.9)	446 000	9 000	2.0	455 000	2.9	459 000	5.1	492 000
B.2. Production and Processing of Nuclear and Reactor Materials	330 000	(103 000)	(31.2)	227 000	5 000	2.2	232 000	3.1	234 000	4.5	250 000
B.3. Reactor Fuel Design, Fabrication and Performance	345 000	63 000	18.3	408 000	(28 000)	(6.9)	380 000	3.2	421 000	4.5	410 000
B.4. Spent Fuel Management	285 000	98 000	34.4	383 000	33 000	8.6	416 000	2.9	394 000	4.9	449 000
Programme B Total	1 455 000	9 000	0.6	1 464 000	19 000	1.3	1 483 000	3.0	1 508 000	4.8	1 601 000

Summary of main means by Area of Activity

Table 10

Area of Activity	Man-years P	Man-years GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	TC support & advisory services	Total	Responsible Division
	1987/1988 Estimates (Regular Budget)										
B.1. Resources and Supply of Uranium and Thorium	9.0	4.0	-	170 000	260 000	-	-	51 000	470 000	951 000	NENF
B.2. Production and Processing of Nuclear and Reactor Materials	4.0	2.0	-	54 000	270 000	-	-	30 000	130 000	484 000	NENF
B.3. Reactor Fuel Design, Fabrication and Performance	3.2	2.0	120 000	31 000	420 000	-	-	190 000	70 000	831 000	NENF
B.4. Spent Fuel Management	6.8	4.0	70 000	13 000	460 000	-	-	230 000	70 000	843 000	NENF
Programme B Total	23.0	12.0	190 000	268 000	1 410 000	-	-	501 000	740 000	3 109 000	

Programme Area 1: List of projects and estimated resources for 1987/1988

Table 11

		Project	Estimated Resources for 1987/1988			
			Regular Budget	TC resources	Extra-budgetary resources	Total
Programme B Area of Activity		NUCLEAR FUEL CYCLE				
B.1.		Resources and Supply of Uranium and Thorium				
	B.1.01	Collection, evaluation and maintenance of data on world nuclear fuel resources and related geological information	357 000	-	-	357 000
	B.1.02	Exchange of information on uranium and thorium geology, exploration and mining	428 000	-	-	428 000
	B.1.03	Provision of assistance to specific developing Member States in strengthening their capabilities and capacities regarding uranium exploration, assessment and ore production	166 000	3 245 000	-	3 411 000
B.1.		Sub - Total	951 000	3 245 000	-	4 196 000
B.2.		Production and Processing of Nuclear and Reactor Materials				
	B.2.01	Exchange of information on the status of and trends in nuclear and reactor materials production and processing technology and on nuclear fuel cycle facilities throughout the world	411 000	-	-	411 000
	B.2.02	Provision of guidance on the establishment and development of nuclear and reactor materials production and processing activities in developing countries	73 000	365 000	-	438 000
B.2.		Sub - Total	484 000	365 000	-	849 000
B.3.		Reactor Fuel Design, Fabrication and Performance				
	B.3.01	To enhance international co-operation in the improvement of nuclear reactor fuel design, fabrication, utilization and performance	831 000	577 000	-	1 408 000
B.3.		Sub - Total	831 000	577 000	-	1 408 000
B.4.		Spent Fuel Management				
	B.4.01	Evaluation of information on spent nuclear fuel arisings and capacity requirements	93 000	-	-	93 000
	B.4.02	To enhance international co-operation in the selection of spent fuel storage options and practices	489 000	315 000	-	804 000
	B.4.03	Exchange of information on spent fuel treatment, the recycling of fissile materials and the recovery and utilization of other valuable elements	261 000	-	-	261 000
B.4.		Sub - Total	843 000	315 000	-	1 158 000
Programme B		Nuclear Fuel Cycle	3 109 000	4 502 000	-	7 611 000

PROGRAMME C: RADIOACTIVE WASTE MANAGEMENT

Area of Activity C.1
Handling, Treatment, Conditioning and Storage of Radioactive Waste

PROBLEM I

C/1. Member States need to develop and introduce waste processing and storage technology for all types of radioactive wastes.

ASSESSMENT AND ANALYSIS

C/2. Member States produce radioactive wastes in solid, liquid and gaseous form from a variety of nuclear energy activities consisting of uranium and thorium mining and milling, institutional uses of radionuclides, nuclear research centres and power stations and associated fuel cycle activites. The volumes of radioactive waste produced are growing steadily as Member States expand their use of isotopes and introduce or increase nuclear power generating capacity. Processes to reduce volumes and produce immobilized waste forms must be developed for the safe containment of these wastes. Depending on the nature of a country's nuclear programme and its social and economic structure, different types of activity, technical assistance and technology development are necessary.

ROLE OF THE AGENCY

C/3. It is not feasible for many individual countries to perform extensive research and development on the various technologies for the processing and storage of wastes. Through its well-established mechanisms for technology review and evaluation, the Agency can assist Member States by providing a forum for the collection and dissemination of information on the technical, scientific and regulatory aspects of waste processing and storage technologies. In accordance with the different needs and levels of development of Member States, the Agency also provides technical assistance and guidance for the establishment and implementation of waste processing and storage programmes.

Project C.1.01

To disseminate technical, scientific and regulatory information on waste processing and storage

C/4. Objective: To provide an effective forum for the exchange of technical information by collecting, reviewing and disseminating information on waste processing and storage technologies and regulatory developments.

C/5. Addressee: Technical and senior staff responsible for the management of radioactive wastes, regulatory personnel and national officials responsible for decisions on waste processing and storage strategy.

C/6. Main means of achieving objective: Meetings, publishing reports.

C/7. Project planning and duration: Since 1980, this project has concentrated on the management of low- and intermediate- level wastes, especially those generated by nuclear power plants, and on volume reduction and immobilization of alpha-bearing and high-level wastes. A total of 18 publications have been issued in this area. During the period 1987-88, efforts will focus on the handling and treatment of reactor wastes from normal and unplanned events, treatment technologies for low- and intermediate- level wastes and the evaluation of solidified waste forms and packages for storage and/or disposal. Some 10 technical reports and documents will be prepared, and a symposium will be held in 1988.

C/8. Output: Availability of the latest technical and scientific information on aspects of waste processing and storage technology which are of interest to Member States establishing, or with established, nuclear power programmes.

Project C.1.02

To provide assistance to Member States with, and encourage research and development on, waste processing and storage technology

C/9. Objective: To provide guidance and assistance and encourage research and development on the safe handling, processing and storage of radioactive wastes.

C/10. Addressee: Technical and senior staff responsible for the management of radioactive wastes, regulatory personnel and national officials responsible for decisions on waste processing and storage strategy.

C/11. Main means of achieving objective: Supplying experts and equipment, training, supporting research.

C/12. Project planning and duration: In 1987 and 1988, TC activities in the regions of Latin America, the Middle East and Asia and the Pacific will continue to be the main focus of attention. In addition, research will be supported in developed and developing countries through four CRPs dealing with the performance of solid radioactive waste forms and engineering barriers, the retention of iodine and other airborne radionuclides and the use of inorganic sorbents for liquid waste treatment and disposal. Three technical publications will be prepared on low- and intermediate-level wastes and spent radiation sources from radioisotope users.

C/13. Output: Broad base of technical and regulatory knowledge and expertise for use in establishing and implementing national waste management programmes and new data in specific research areas.

Area of Activity C.2
Radioactive Waste Disposal

PROBLEM I

C/14. Need to prepare international safety guidelines and technical guidance on the underground disposal of radioactive wastes.

ASSESSMENT AND ANALYSIS

C/15. Underground disposal is currently the most favoured option for the disposal of radioactive wastes. Different formations are being studied by Member States for disposal into shallow ground, rock cavities and deep geological formations.

C/16. Following the recommendation of the Scientific Advisory Committee that the Agency should play a more active role in worldwide international co-operation in the field of waste disposal, an integrated 10-year programme in this field was initiated in 1978 and has been regularly reviewed and updated by a technical review committee since then. A considerable amount of work has already been carried out through the publication of safety series and technical reports as well as through technical assistance. Most of the work for disposal in shallow ground and rock cavities has been completed. In the remaining phase, standards and criteria for deep geological disposal and reports on various technical aspects of the problem will be drawn up.

ROLE OF THE AGENCY

C/17. The Agency can provide Member States with internationally agreed guidelines and technical guidance on regulatory aspects and on quantities of wastes which are exempt from regulations for low-level wastes.

Project C.2.01

Preparation of regulatory guidelines for the underground disposal of radioactive wastes

C/18. Objective: The objective is to develop internationally agreed guidelines to assist Member States in establishing national standards, criteria and regulations for the underground disposal of radioactive wastes.

C/19. Addressee: Regulatory bodies, designers and operators of waste repositories.

C/20. Main means of achieving objective: Meetings, publishing reports.

C/21. Project planning and duration: The project, which is already under way, will be completed by 1989. Two safety series reports containing guidelines for the regulation of underground repositories and acceptance criteria for the underground disposal of radioactive wastes in deep geological formations will be published. A report on international standards and criteria for the underground disposal of high-level wastes will be prepared.

A code of practice dealing with the disposal of wastes in shallow ground, rock cavities and deep geological repositories, together with two-three associated guides, will be drawn up.

C/22. Output: An authoritative basis for preparing national regulations on underground disposal of radioactive wastes.

Project C.2.02

To establish the principles and practice for exempting sources of radiation from regulatory control

C/23. 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 important areas of waste management, namely low-level waste disposal in the terrestrial and marine environments, the decommissioning of nuclear sites and the re-use of slightly contaminated materials.

C/24. Addressee: Nuclear regulatory and environmental authorities, public health departments, international agencies with responsibility for radiological and environmental protection.

C/25. Main means of achieving objective: Meetings, publishing documents.

C/26. Project planning and duration: The project will be completed by 1989.

C/27. Output: Member States will benefit from having international agreement in this area.

Project C.2.03

Exchange of information and development of technological and engineering guidance on underground disposal of radioactive wastes

C/28. Objective: To provide a forum for the exchange of technological and engineering information on the siting, design, construction, operation, shutdown and closing of deep geological repositories.

C/29. Addressee: Regulatory authorities, designers and operators of waste repositories.

C/30. Main means of achieving objective: Meetings, publishing reports, supporting research.

C/31. Project planning and duration: The activities to be carried out on the siting, design, construction and operation of deep underground repositories for the disposal of high-level radioactive wastes will complement the work already performed under the 10-year programme on the technological and engineering aspects of other types of underground disposal. Information

on borehole plugging and shaft sealing in connection with the disposal of radioactive wastes in deep geological formations will be published in a technical report in 1988. Two safety series reports on the siting, design and construction and on the operation, shutdown and closing of deep geological repositories will be issued in 1989.

C/32. Output: Increased information and capabilities regarding the construction and operation of deep underground repositories for the disposal of radioactive waste.

PROBLEM II

C/33. To carry out IAEA responsibilities under international conventions and to perform interagency activities, including monitoring and assessment, for the protection of the marine environment.

ASSESSMENT AND ANALYSIS

C/34. The disposal of radioactive waste into the marine environment is of international concern. Global and regional legal instruments for its control have resulted in Agency guidance and involvement both in providing regulations and recommendations and in scientific research.

C/35. The technical and scientific bases for the control of such disposal require constant updating. Advances made in scientific knowledge about the ocean and its ecology and in refining radiation protection practices need to be continuously assessed to determine if changes are required in the guidance given by the Agency to various legal instruments.

ROLE OF THE AGENCY

C/36. The London Dumping Convention names the Agency as the competent authority in radioactive matters. As one of a number of United Nations bodies dealing with marine pollution, the Agency, which operates the International Laboratory of Marine Radioactivity, is the specialist in radioactivity in the sea, both from a regulatory as well as a research standpoint.

Project C.2.04

Development of regulatory criteria for disposal of radioactive waste in the marine environment

C/37. Objective: To keep under review the Agency's Definition and Recommendations under the London Dumping Convention, to update the relevant data base and to contribute to interagency activities relating to the environmental impact of radionuclides in the marine environment.

C/38. Addressee: National authorities, marine scientists, environmental organizations and other agencies involved with marine pollution.

C/39. Main means of achieving objective: Meetings, publishing reports, supplying experts to other organizations, maintaining a data base.

C/40. Project planning and duration: The next revision of the Definition and Recommendations is expected in 7-10 years. During this time technical documents will be prepared on such topics as the agreement on dose upper bounds, exemption rules for disposal into coastal and shelf waters (jointly with Project C.2.02), evaluation of the impact of dumping on deep sea organisms and an updated data base for modelling.

C/41. Output: Internationally agreed regulations and contributions to technical information.

Project C.2.05

Technical support for marine radioactivity monitoring and investigation (Monaco Laboratory)

C/42. Objective: To develop improved analytical techniques for monitoring marine radioactivity, to transfer information on methods and to assist in improving the reliability of data produced by Member States.

C/43. Addressee: National authorities and insititutions responsible for environmental monitoring and investigation around nuclear installations and radioactive waste disposal sites.

C/44. Main means of achieving objective: Training, publishing reports, supporting research and development, laboratory analytical quality control services.

C/45. Project planning and duration: Work on the development and improvement of methods for measuring selected radionuclides in the marine environment will concentrate on ^{129}I and ^{63}Ni in the period 1987-88. Information will be disseminated through the training of personnel from developing countries and the publication of the methods developed. Intercalibration exercises with co-operating laboratories in Member States will continue.

C/46. Output: Improved analytical methods and data reliability and increased number of trained personnel.

Project C.2.06

Data collection, evaluation and research on radionuclide inputs into the marine environment (Monaco Laboratory)

C/47. Objective: To provide scientific data useful to Member States and international and regional organizations for evaluating the environmental impact of radionuclides entering the marine environment from nuclear installations, radioactive waste disposal sites and other sources.

C/48. Addressee: National regulatory authorities, international and regional organizations and institutions responsible for evaluating the environmental impact of radionuclide releases into the marine environment.

C/49. Main means of achieving objective: Participation in oceanographic cruises, obtaining environmental samples (sediment, biota and water) for analysis from laboratories in Member States, performing experimental studies, compiling data, holding meetings and publishing results.

C/50. Project planning and duration: The behaviour of specific radionuclides released to the marine environment as a result of nuclear fuel cycle activities will be studied. Samples from different oceans and seas will be obtained through the participation of staff in cruises as well as from other laboratories. Biological and geochemical experiments for the assessment of the transport and transfer of radionuclides from water to marine organisms and across the sediment/water interface will continue. Data compilations to obtain inventories and fluxes of radionuclides will be expanded from the four nuclides initially studied (Cs, Po/Pb, Pu and C) to tritium, ^{60}Co, ^{99}Tc and possibly ^{90}Sr depending on advice still to be given by consultants and the degree of information available.

C/51. Output: Contribution to scientific information and an improved data base for the assessment of the impact of radionuclides on the marine environment.

PROBLEM III

C/52. Need to establish the environmental safety of waste management operations.

ASSESSMENT AND ANALYSIS

C/53. One of the most important issues at present in radioactive waste management is the demonstration of the safety of proposed disposal procedures. While there is confidence within the scientific community that proposed techniques are capable of providing an adequate degree of safety, demonstration is difficult, mainly because of the extremely long timescales involved. The subject has to be approached by means of predictive modelling supported by experimental programmes designed to improve the data available on the environmental behaviour of radionuclides and possibly also by studies on the environmental behaviour of natural analogues.

ROLE OF THE AGENCY

C/54. Because of its central position, the Agency can facilitate the establishment of a coherent international approach to the development of safety assessment methodologies for radioactive waste disposal. In addition, it can encourage research to provide the environmental data needed to increase the reliability of assessment techniques.

Project C.2.07

To assess, and to develop methods for assessing, the radiological and environmental effects of waste disposal practices

C/55. Objective: To develop internationally accepted methods for assessing the radiological and environmental effects of existing and planned waste disposal practices and to encourage research on the acquisition of the environmental transfer data needed to improve the reliability of such assessments.

C/56. Addressee: Nuclear regulatory and environmental authorities, public health departments.

C/57. Main means of achieving objective: Meetings, supporting research and development, publishing reports.

C/58. Project planning and duration: The project is expected to continue until 1990. In the period 1985-1988, six technical reports will be prepared on the development of methods for establishing the reliability of environmental transfer models, on the migration and biological transfer of radionuclides from shallow land burial repositories, on the behaviour of radium in the environment, on the application of analogues in predicting the migration of radionuclides under ground and on the effects of waste disposal practices on terrestrial ecosystems and species other than man.

C/59. Output: Authoritative international guidance and information.

Project C.2.08

To improve public understanding and acceptance of established radioactive waste disposal methods

C/60. Objective: To provide understandable, up-to-date and technically accurate information material on radioactive waste disposal.

C/61. Addressee: Responsible, but not necessarily technically trained, members of the public, national authorities, and representatives of the nuclear industry.

C/62. Main means of achieving objective: Meetings, publishing reports.

C/63. Project planning and duration: The project will be initiated in 1986 and in 1988 a report will be published on technical, social and educational aspects.

C/64. Output: Information which is both technically accurate and can be readily understood by the public.

C. RADIOACTIVE WASTE MANAGEMENT

PROBLEM IV

C/65. Member States need direct assistance and guidance in the development and implementation of their national waste management programmes

ASSESSMENT AND ANALYSIS

C/66. In the practical implementation of radioactive waste management programmes involving the handling, processing, storage and final disposal of wastes, countries with limited nuclear activities and modest infrastructures rely on the Agency's services. In view of the rapid development of procedures and practices, many Member States find it impossible to maintain an independent capability in this area.

ROLE OF THE AGENCY

C/67. The Agency offers a forum for the exchange of information on all aspects of radioactive waste management. It disseminates this information in the form either of periodic publications or of direct guidance to individual Member States.

Project C.2.09

To provide assistance to Member States in developing their national radioactive waste management programmes

C/68. Objective: To create the basis for the organization of adequate and appropriate national integrated programmes for the management of radioactive waste.

C/69. Addressee: Policy makers, governmental, regulatory and executive authorities, scientists and technologists responsible for waste management programmes and projects, and officials responsible for the administration of research programmes.

C/70. Main means of achieving objective: Supplying experts, publishing reports.

C/71. Project planning and duration: It is planned to establish a new type of assistance for the integrated management of radioactive waste. Teams of 4-5 experts with specialist knowledge in different fields of waste management (as appropriate) will be sent to requesting Member States to advise on the establishment and operation of national waste management schemes. In the period 1987-88, 2-3 such missions, each of one week's duration, will be organized annually.

C/72. The Waste Management Research Abstracts will continue to be published annually.

C/73. Output: Improved basis for planning waste management programmes.

Area of Activity C.3.
Decommissioning of Nuclear Installations

PROBLEM I

C/74. Member States need technical and regulatory guidance and assistance regarding the safe decontamination and decommissioning of nuclear facilities.

ASSESSMENT AND ANALYSIS

C/75. In the next two decades, some hundreds of nuclear facilities will be decommissioned by Member States and many uranium and thorium mine sites and tailings piles will have to be stabilized and/or rehabilitated. To carry out these tasks in a safe, timely and cost-effective manner, Member States must have suitable regulatory procedures and access to the latest methodology and technology. This information is an essential element in the development of a long-term nuclear option since the public must be convinced that the decommissioning of facilities can be done safely and at reasonable cost. In addition, the data will be of value to designers who wish to incorporate features in new facilities so as to make decommissioning and decontamination easier.

ROLE OF THE AGENCY

C/76. Since the number of facilities being decommissioned is still limited, it is important for Member States to have access to information on practical experience in this area. The Agency can assist them by co-ordinating the collection and dissemination of information on all important aspects of decommissioning problems. Also, since the level of development of this technology varies widely in Member States, the Agency can provide technical assistance in the establishment and implementation of national decommissioning programmes.

Project C.3.01

Establishment of guidelines for the decommissioning of nuclear installations

C/77. Objective: To provide a forum for the exchange of technical information by collecting, reviewing and disseminating the latest technical and regulatory data on decommissioning and to provide guidance and assistance to Member States in this area.

C/78. Addressee: Designers, owners, operators, policy makers and regulatory bodies involved with the decommissioning of nuclear facilities.

C/79. Main means of achieving objective: Meetings, publishing reports, supporting research.

C/80. Project planning and duration: The project will commence in 1986 and terminate in 1990. During this period a total of ten technical reports will be prepared, concentrating on the subjects of reducing occupational

exposures, the re-use of metal parts, remotely controlled equipment, regulatory procedures, monitoring for compliance with regulations, decontamination and demolition, and the stabilization of tailings piles.

C/81. Output: Up-to-date technical and regulatory data on the decommissioning of nuclear facilities and on the stabilization and rehabilitation of uranium and thorium mine sites and tailings piles. Basis for the establishment and implementation of national programmes on these topics.

Summary of budget estimates by Area of Activity

Table 12

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
C.1. Handling, Treatment, Conditioning and Storage of Radioactive Waste	635 000	4 000	0.6	639 000	55 000	8.6	694 000	3.1	659 000	4.4	747 000
C.2. Radioactive Waste Disposal	1 769 000	96 000	5.4	1 865 000	(73 000)	(3.9)	1 792 000	3.3	1 927 000	5.0	1 945 000
C.3. Decommissioning of Nuclear Installations	188 000	(25 000)	(13.3)	163 000	72 000	44.2	235 000	3.1	168 000	3.6	251 000
SNSP (Net)	-	116 000	-	116 000	139 000	119.8	255 000	3.5	120 000	4.8	276 000
Programme C Total	2 592 000	191 000	7.4	2 783 000	193 000	6.9	2 976 000	3.3	2 874 000	4.7	3 219 000

Summary of main means by Area of Activity

Table 13

Area of Activity	1987/1988 Estimates (Regular Budget) Man-years a/ P	GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	SNSP (Net) b/	TC support & advisory services	Total	Responsible Division
C.1. Handling, Treatment, Conditioning and Storage of Radioactive Waste	7.2	4.6	180 000	26 000	620 000	-	80 000	320 000	-	180 000	1 406 000	NENF
C.2. Radioactive Waste Disposal	11.4	6.8	-	53 000	940 000	-	400 000	300 000	-	160 000	1 853 000	NENF
	15.0	26.0	-	-	29 000	-	-	1 990 000	-	-	2 019 000	RIML
C.3. Decommissioning of Nuclear Installations	2.4	2.6	-	-	160 000	-	110 000	130 000	-	19 000	419 000	NENF
Supplementary Nuclear Safety Programme (SNSP) (Net)	a/	a/	-	-	-	-	-	-	396 000	-	396 000	NENF
Programme C Total	36.0	40.0	180 000	79 000	1 749 000	-	590 000	2 740 000	396 000	359 000	6 093 000	

a/ Does not include possible additional manpower for the SNSP.

b/ The "main means" of implementing the SNSP have not yet been decided.

Programme Area 1: List of projects and estimated resources for 1987/1988

Table 14

		Project	Estimated Resources for 1987/1988			
			Regular Budget	TC resources	Extra-budgetary resources a/	Total
Programme C Area of Activity		RADIOACTIVE WASTE MANAGEMENT				
C.1.		Handling, Treatment, Conditioning and Storage of Radioactive Waste				
	C.1.01	To disseminate technical, scientific and regulatory information on waste processing and storage	886 000	-	-	886 000
	C.1.02	To provide assistance to Member States with, and encourage research and development on, waste processing and storage technology	520 000	-	-	520 000
C.1.		Sub - Total	1 406 000	-	-	1 406 000
C.2.		Radioactive Waste Disposal				
	C.2.01	Preparation of regulatory guidelines for the underground disposal of radioactive wastes	298 000	-	-	298 000
	C.2.02	To establish the principles and practice for exempting sources of radiation from regulatory control	113 000	-	-	113 000
	C.2.03	Exchange of information and development of technological and engineering guidance on underground disposal of radioactive wastes	280 000	-	-	280 000
	C.2.04	Development of regulatory criteria for disposal of radioactive waste in the marine environment	336 000	-	-	336 000
	C.2.05	Technical support for marine radioactivity monitoring and investigation (Monaco Laboratory)	757 000	-	-	757 000
	C.2.06	Data collection, evaluation and research on radionuclide inputs into the marine environment (Monaco Laboratory)	1 262 000	-	233 000	1 495 000
	C.2.07	To assess, and to develop methods for assessing the radiological and environmental effects of waste disposal practices	631 000	-	-	631 000
	C.2.08	To improve public understanding and acceptance of established radioactive waste disposal methods	149 000	-	-	149 000
	C.2.09	To provide assistance to Member States in developing their national radioactive waste management programmes	46 000	1 365 000	-	1 411 000
C.2.		Sub - Total	3 872 000	1 365 000	233 000	5 470 000
C.3.		Decommissioning of Nuclear Installations				
	C.3.01	Establishment of guidelines for the decommissioning of nuclear installations	419 000	-	-	419 000
C.3.		Sub - Total	419 000	-	-	419 000
		SNSP (Net)	396 000	-	-	396 000
Programme C		Radioactive Waste Management	6 093 000	1 365 000	233 000	7 691 000
Total Programme Area 1		Nuclear Power and the Fuel Cycle	18 154 000	11 574 000	233 000	29 961 000

a/ Includes funds from other UN organizations.

PROGRAMME AREA 2

NUCLEAR APPLICATIONS

Summary of resources by programme

Table 15

Programme	Man-years a/ P	Man-years a/ GS	Planned expenditure for the implementation of the programme in 1987/1988: Regular Budget estimates	Funds from other UN organizations	TC resources	Other extra-budgetary resources	Total
D. Food and Agriculture	34.0 [24.0]	16.0 [29.6] [29.6] M&O	10 951 000	2 638 000	30 786 000	1 688 000	46 063 000
E. Human Health	33.0 [2.8]	24.0 [12.2] [3.6] M&O	6 791 000	820 000	12 858 000	361 000	20 830 000
SNSP (Net)	a/	a/	387 000	-	-	-	387 000
F. Industry and Earth Sciences	14.4 [8.0]	7.6 [16.0] [2.0] M&O	3 170 000	1 200 000	2 247 000	430 000	7 047 000
G. Physical and Chemical Sciences	57.8 [9.4]	77.0 [27.2] [7.0] M&O	10 533 000	1 920 000	16 564 000	22 204 000	51 221 000
Programme Area 2	139.2	124.6	31 832 000	6 578 000	62 455 000	24 683 000	125 548 000

a/ Does not include possible additional manpower for the SNSP.

Note: The manpower figures shown in parenthesis represent the number of man-years of Agency Laboratory staff working for that particular programme.

PROGRAMME D: FOOD AND AGRICULTURE

Area of Activity D.1
Agricultural Production

PROBLEM I

D/1. Sub-optimal crop productivity due to unsatisfactory soil nutrition, water and pesticide management practices and plant genetic make-up.

ASSESSMENT AND ANALYSIS

D/2. In order to increase crop yields, it is necessary to introduce advanced techniques and improved agricultural management. One method of increasing yield is to improve the efficiency of fertilizer use, taking into account local conditions.

D/3. Cheaper and alternative plant nutrient resources such as local deposits of rock phosphate or atmospheric nitrogen are being increasingly investigated throughout the world, and isotope and related biotechnological techniques are effective tools in studies to optimize their efficient use.

D/4. The provision of adequate water supply is one of the greatest problems in crop production. Proper methods for assessing the need for water during the growing season, conserving available water and selecting plant varieties for drought tolerance are necessary for optimal water management.

D/5. There are many areas of the world where the agriculturally productive lands have virtually been exhausted. Salt-affected soils represent a substantial portion of the marginal soils which will now have to be exploited. Through proper soil management - for example, by identifying, breeding and growing saline-tolerant plants on salt-affected soils - it is possible to bring large tracts of land back into productive use.

D/6. Improving the performance of crop plants is essential if food production is to be increased. To give high yields, crop varieties must respond to fertilizer application and be suitable for mechanization, water management and pesticide applications. The induction of mutations significantly supplements other approaches and increases the likelihood of successful plant breeding. Biotechnological in vitro techniques combined with irradiation are a promising means of increasing the efficiency of plant breeding.

ROLE OF THE AGENCY

D/7. Through the Joint FAO/IAEA Division and the Agency's Agriculture Laboratory, the Agency has the experience and expertise to assist developing Member States to use nuclear methods in solving problems relating to increased crop productivity. This will be achieved by co-ordinating research, supporting related TC projects, advising on methodologies or providing practical assistance such as ^{15}N analyses, mutation induction and training. In carrying out this role, close contact and co-operation will be maintained with relevant FAO Divisions.

D/8. The use of isotopic and related techniques has been invaluable in solving many problems in soil fertility, plant nutrition, biological nitrogen fixation and soil moisture. The only direct method for distinguishing between plant nutrients taken up from various sources is through the use of isotope techniques. Likewise, the use of irradiation and related techniques in connection with modern biotechnology have proven effective in achieving genetic improvements in plants.

Project D.1.01

To strengthen research capabilities for optimizing the use of water, fertilizers and other agrochemicals

D/9. Objective: To contribute to Member States' efforts to ensure - through proper soil management practices, including irrigation - that water which can be used for crop production is conserved, especially during periods of abundance, to be used during periods of drought and to establish the fertilizer type, form and placement and the effect of season and environmental factors on the efficiency of fertilizer uptake by various food and tree crops.

D/10. Addressee: National authorities responsible for agriculture and atomic energy, agricultural experimental stations, universities, international organizations (FAO).

D/11. Main means of achieving objective: Supporting research and development, supplying experts and equipment, training, laboratory services.

D/12. Project planning and duration: Research will be promoted on appropriate isotope labelling techniques and the use of neutron probes to assess fertilizer efficiency and water content in soils under field conditions in developing Member States. Plant nutrients such as nitrogen and phosphorus, including naturally occurring rich phosphates, will be emphasized. Annual training courses will be held. The Agency's Agriculture Laboratory will provide essential support and services.

D/13. In the period 1987-88, in addition to training, approximately 20 TC projects will be executed. Two CRPs focusing on the nutrition of tree crops and on enhancing the use of natural fertilizers will be implemented.

D/14. Output: Enhanced research capability and information regarding the optimization of crop yields without excessive fertilizer applications, including the use of natural resources such as rock phosphates and water.

Project D.1.02

Through the use of isotope techniques, to facilitate research aimed at enhancing biological nitrogen fixation

D/15. Objective: To assist Member States in their research on biological nitrogen fixation by establishing or improving their ability to use nuclear techniques to assess the amount of nitrogen fixed.

D/16. Addressee: National authorities responsible for agriculture and atomic energy, agricultural experimental stations, universities, international organizations (FAO).

D/17. Main means of achieving objectives: Supporting research and development, supplying experts and equipment, training, laboratory services.

D/18. Project planning and duration: Assessment of atmospheric nitrogen fixed by crops can be achieved under field conditions using ^{15}N. This method will be adapted to the different agricultural needs of developing Member States (for example, rice in association with Azolla, mixed cropping systems which include a legume) and transferred through the above mechanisms. The method will also be used in the selection of grain legumes capable of fixing nitrogen. In the period 1987-88, approximately 30 TC projects will be implemented and two training courses held. Two CRPs on Azolla association and on selection for enhanced nitrogen fixation in grain legumes will be continued.

D/19. Output: Basis for improved management practices for selected food crops.

Project D.1.03

To facilitate research to improve crop production in salt-affected soils

D/20. Objective: To strengthen research capabilities aimed at developing suitable management practices which will halt the deterioration through salinity of otherwise productive soils.

D/21. Addressee: National authorities responsible for soil, water, irrigation, land reclamation and atomic energy, agricultural experimental stations and universities.

D/22. Main means of achieving objective: Supporting research and development, supplying experts and equipment, training, laboratory services.

D/23. Project planning and duration: Soils damaged by salinity are difficult to reclaim, one main remedy being accurately controlled irrigation practices. Neutron probe measurements provide an ideal method of assessing the water content in the soil during cropping. Fertilizer applications have to be adapted to the salinity and will be studied through isotope labelling. Certain locally adapted plant species (such as Kallar grass) will be studied mainly for their ability to fix nitrogen and improve the soil structure. Mutation breeding will focus on the adaptation of food crops to soil salinity.

D/24. Output: Increased information on the improvement of crop production in selected salt-affected soils.

Project D.1.04

Maintaining a data bank for induced mutant germ plasm resources

D/25. Objective: To collect and disseminate information on mutant crop germ plasm, to maintain a computerized data bank on their heritable and agronomic value and to assist Member States in maintaining mutant germ plasm of important crops as a source of genes for breeding.

D/26. Addressee: Plant breeding institutions and genetic resource centres in Member States, international organizations (FAO).

D/27. Main means of achieving objective: Supporting research and development, maintaining a data base, publishing reports, training, supplying experts and equipment.

D/28. Project planning and duration: The data bank was set up many years ago and computerized in 1980. The number of mutants on which the data bank contains information was over 400 in 1985 and is increasing at an annual rate of about 10%. The Agency will continue to be the focal point for collecting and disseminating information obtained in Member States. Assistance will be provided to institutes in Member States where mutant germ plasm is maintained.

D/29. Output: Access to data on existing and future mutant crop germ plasm.

Project D.1.05

To assist the development and acquisition of skills and capabilities to improve cultivars through mutation breeding and related biotechnological methods

D/30. Objective: To develop improved cultivars of agricultural and horticultural crop plants by mutation and related biotechnological methods, to develop and adapt the most effective and economic methodology for mutation induction, to develop the means for the most efficient selection of mutants with specific desired characteristics in vivo and in vitro, and to assist with large-scale testing of promising mutants and their recombinants in Member States.

D/31. Addressee: National authorities responsible for agriculture and atomic energy, plant breeding and genetic institutes, universities, international organizations (FAO) and institutes.

D/32. Main means of achieving objective: Supporting research and development, meetings, supplying experts and equipment, training, laboratory services.

D/33. Project planning and duration: Activities will centre on four main groups of food crops: cereals, legumes, tuber and industrial crops. Depending on local conditions in Member States, the most important crops need improvement in terms of yield increase, earliness, resistance to pests and diseases, tolerance to adverse stresses (e.g. salinity, drought, climate), quality characteristics and new uses.

D/34. In the period 1987-88, in addition to providing training through fellowships and at least two courses, approximately 25 TC projects will be implemented and one regional seminar held. Six CRPs will be at different stages of implementation. Support will be provided by the Agency's Agriculture Laboratory.

D/35. Output: Increased capability to improve existing cultivars and to reduce the time required for producing new ones.

PROBLEM II

D/36. Sub-optimal livestock productivity due to inadequate nutrition, low reproductive efficiency and diseases.

ASSESSMENT AND ANALYSIS

D/37. Livestock productivity in the developing world is extremely low. This is largely due to the types of animal used, poor nutrition and environmental stresses, all of which contribute to poor growth rates and low reproductive efficiency. Nuclear and related techniques, used in conjunction with feeding trials and/or the measurement of simple reproductive parameters, provide information about the quality of locally available feeds and the reproductive behaviour of different animal genotypes in the same or different environments.

D/38. Livestock diseases adversely affect food production in all parts of the world and disease control is therefore a high priority requirement. Radiation (in the production of radiation-attenuated vaccines) is widely used for the direct control of certain diseases, and other biotechnological techniques based on isotopes and enzymes (radioimmunoassay (RIA) and enzyme-linked immunosorbent assay (ELISA)) are used for the accurate diagnosis of disease. Together these provide the basis whereby proper control procedures can be implemented.

D/39. Treatment of trypanosomiasis in infected cattle in Africa is based on the use of a relatively small number of synthetic drugs. Development of new trypanocidal drugs is extremely difficult, but a few drugs have been screened and found to be active against trypanosomes. Isotope labelling provides an effective tool in the search for efficient formulations.

ROLE OF THE AGENCY

D/40. Through the Joint FAO/IAEA Division and the Agency's Agriculture Laboratory, the Agency helps developing Member States to improve the productivity of livestock by promoting nuclear and related techniques in studies on nutrition, reproduction, disease diagnosis and control. This will be done by assisting selected research scientists and institutions to achieve competence in these techniques through the mechanisms of CRPs in relevant fields, TC projects including training, and information exchange. In implementing these activities close contact and co-operation will be maintained with relevant FAO Divisions.

Project D.1.06

To establish and strengthen research capabilities for optimizing the reproductive efficiency of livestock through the use of RIA and related techniques

D/41. Objective: To establish or improve the infrastructure required to initiate and develop programmes on animal reproduction utilizing RIA and ELISA methods for measuring reproductive hormone levels in the blood and milk of domestic livestock and to increase the use of these methods under animal breeding and reproductive programmes with a view to optimizing the reproductive efficiency of different genotypes kept in the same or different environments.

D/42. Addressee: Animal and veterinary research institutes and university departments, national atomic energy authorities and relevant international organizations (FAO).

D/43. Main means of achieving objective: Supplying experts and equipment, supporting research and development, training, laboratory services, meetings.

D/44. Project planning and duration: The focus in the vast majority of cases will be the measurement of the hormone progesterone using RIA and ELISA methods in the blood or milk of a wide variety of species and breeds of livestock used for meat and milk production, including cattle, sheep, goats, buffaloes and cameloids. Emphasis will be placed on the use of progesterone and clinical examination of livestock to monitor the onset of puberty and ovarian activity post partum and on the influence of different management factors on these aspects of reproduction. In addition to establishing the infrastructure needed to achieve the objectives above, kits consisting of labelled progesterone, antisera and standards will be prepared and distributed to Member States from the Agency's Agriculture Laboratory. These kits, together with a quality control service, will be used to effect inter- and intra-laboratory comparisons of data, and hence ensure reliable data interpretation.

D/45. In 1987-88, it is planned to conduct three CRPs, a training course, a regional seminar and some 20 TC projects, all dealing with the application of RIA and ELISA as tools in efforts to improve the reproductive efficiency of livestock.

D/46. Output: Increased information and strengthened research capabilities to optimize the reproductive efficiency of livestock.

Project D.1.07

To establish and enhance capabilities for improving the nutrition of ruminant livestock through the use of nuclear and related techniques

D/47. Objective: To establish or improve the infrastructure needed for programmes on animal nutrition which combine the use of conventional and isotope methods for measuring in vitro and in vivo the nutritive value of pastures, forages and other agro-industrial by-products as feed for ruminants.

D/48. Addressee: Animal and veterinary research institutes and university departments, national atomic energy authorities and relevant international organizations (FAO).

D/49. Main means of achieving objective: Supplying experts and equipment, supporting research and development, training, laboratory services, meetings, publishing reports.

D/50. Project planning and duration: Emphasis will be put on the development and application of isotope techniques for measuring digesta flow and composition in different animal genotypes fed straw-based diets or pastures supplemented with minerals, non-protein nitrogen and/or agro-industrial by-products. The Agency's Agriculture Laboratory will provide analytical services (for example, ^{15}N levels in digesta and macro- and micro-nutrients in plants and feed supplements) as well as training.

D/51. In the period 1987-88, it is planned to conduct two CRPs, one training course, one advisory meeting and some 15 TC projects all relating to aspects of the nutritive value of conventional as well as non-conventional animal feed.

D/52. Output: Data on the nutritive value of potential feedstuffs for ruminants and enhanced research capability.

Project D.1.08

To strengthen capabilities for controlling livestock diseases through the use of radiation, immunoassay and related biotechnological methods.

D/53. Objective: To establish or improve the infrastructure needed for research programmes on the diagnosis, epidemiology and control of animal viral, bacterial and parasitic infections which utilize RIA and ELISA methods, labelled DNA probes, and radiation in combination with conventional serological, immunological and parasitological methods.

D/54. Addressee: Veterinary research institutes and university departments, national disease control organizations and relevant international organizations (FAO).

D/55. Main means of achieving objective: Supplying experts and equipment, supporting research and development, training, laboratory services.

D/56. Project planning and duration: Work will continue to focus on the development of radiation-attenuated vaccines against gastrointestinal parasites and haemoprotozoal infections, and on the epidemiology and diagnosis of viral, bacterial and parasitic infections. In the latter respect, emphasis will be given to the development and application of standardized ELISA techniques, with the Agency's Agriculture Laboratory playing a prominent role in this work. In addition, support will be given to FAO's Pan African Rinderpest Control Campaign. Training of scientists in ELISA techniques will form a major component of the initial stages of the project.

D/57. In the period 1987-1988, it is planned to conduct two CRPS, one training course and 15-20 TC projects focusing on the use of radiation, immunoassay and related biotechnological methods in livestock disease control.

D/58. Output: Wider dissemination and application of information on the use of nuclear and related biotechnological techniques and greater ability to solve problems relating to diagnosis and control of livestock diseases.

Project D.1.09

To study the fate of trypanocidal drugs in African cattle using radioisotopes

D/59. Objective: To assess the efficacy of existing trypanocidal drugs and to develop new formulations that could provide sustained release of the active agent at a desired level for a desired period of time.

D/60. Addressee: National authorities responsible for the use and regulation of trypanocidal drugs and international organizations (FAO, WHO).

D/61. Main means of achieving objective: Supplying experts and equipment, training, laboratory services.

D/62. Project planning and duration: The project will be carried out in close association with the Kenya Trypanosomiasis Research Institute (KETRI) and other co-operating institutes. Of the approaches available to achieve controlled release of biologically active ingredients (in casu trypanocides), the project will focus on promising physical and chemical combinations of trypanocidal drugs. The present phase of the project will terminate during 1988.

D/63. Output: Recommendations on efficient trypanocidal drug treatment of African cattle.

PROBLEM III

D/64. To improve the economic value of agricultural wastes, residues or by-products through biological conversion processes

ASSESSMENT AND ANALYSIS

D/65. Supplies of food, feed, fertilizer or fuel may be derived from agricultural residues, by-products or wastes by means of various technologies. Exploitation of such underutilized natural resources may produce major economic benefits for developing Member States if simple technologies are available. FAO has prepared worldwide inventories of agricultural residues.

D/66. Although biomass rich in starch or sugars may be relatively easily fermented to more valuable products which can be used directly as food or feed, agricultural wastes or residues generally have a high lignocellulosic content and have relatively low value. Simple chemical or biological processes may be employed to improve the value of these residues by converting them into feed, fuel, food, fertilizer or fibre.

D/67. Such concepts require research which takes due account of local conditions. Radioisotopes are used as tools for the investigation of bioconversion processes and help the technologist to diagnose where problems exist and what factors limit the process. Irradiation methods may also be utilized to improve microbial performance by selection of mutants.

ROLE OF THE AGENCY

D/68. The Agency has the experience and expertise to assist in the transfer of the relevant technologies. These include aspects of applied microbiology, studies of microbial metabolism, protein and enzyme analysis.

Project D.1.10

Assessment of data and research on the use of indigenous organisms for the bioconversion of agricultural residues and wastes into animal feeds and plant nutrients

D/69. 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 plant, animal or human nutrition and to evaluate relevant bioconversion processes and products.

D/70. Addressee: Relevant government departments, atomic energy authorities, universities, agricultural institutions and extension services, relevant international organizations (WHO, FAO, UNIDO).

D/71. Main means of achieving objective: Meetings, training.

D/72. Project planning and duration: The project has been carried out in close association with the International Centre for Insect Physiology (ICIPE), Nairobi, and other institutions. Work has centred on the isolation, identification and culturing of microorganisms which degrade cellulose to simple molecules, especially those occurring symbiotically with African termites. The current phase of the project will terminate in 1988.

D/73. Output: Information and guidelines on the efficient exploitation of underutilized agricultural residues and wastes.

Area of Activity D.2
Agricultural and Food Protection

PROBLEM I

D/74. Sub-optimal crop and livestock productivity due to insects and other pests

ASSESSMENT AND ANALYSIS

D/75. Insects and other arthropod pests attack crops at all stages during production and cause annual crop losses of about 20% in the developing world. In addition, they cause direct losses to livestock of between 15% and 20% annually in developing countries. Also, the presence of insects often prevents development of livestock in an otherwise potentially productive area. Insect control thus remains a high priority of developing Member States and depends largely on the use of insecticides. However, because of the problems of insect resistance, safety and environmental pollution associated with insecticides, there is an urgent need to develop alternative methods of controlling insect pests.

D/76. The sterile insect technique (SIT) provides an alternative to insect control by insecticides. Certain situations justify total elimination of an insect pest in a geographical area as, for example, where the economic losses caused by the pest are high. Development over the last twenty years has made the SIT the major, and possibly the only, method of tackling the total elimination of an insect pest in large geographical areas because it is species-specific and environmentally acceptable.

D/77. Other promising methods of insect control which take advantage of modern nuclear techniques and biotechnology, including the possible use of recombinant DNA, employ genetic techniques involving F_1 and hybrid sterility.

ROLE OF THE AGENCY

D/78. The Agency has experience and expertise in mass rearing of insects, radiation sterilization, methods for handling and packaging insects for release in the field and other biotechnological aspects of insect control and is therefore in a position to assist developing Member States to increase their competence in research and related activities aimed at pest control and disease prevention through selected nuclear techniques and related biotechnology.

Project D.2.01

Establishment of capabilities for control or eradication of fruit flies and other insect crop pests using the sterile insect technique and related biotechnological methods

D/79. Objective: To assist developing Member States in using nuclear and related biotechnological methods for the control or eradication of fruit flies and other insect crop pests.

D/80. Addressee: Ministries of agriculture and other national institutions reponsible for pest control and plant quarantine, rural development and atomic energy, universities and relevant international organizations (FAO).

D/81. Main means of achieving objective: Supporting research and development, meetings, supplying experts and equipment, training, laboratory services.

D/82. Project planning and duration: Work will concentrate on the following main subjects: the development of inexpensive rearing diets and systems and of quality control procedures for fruit flies, the development of genetic sexing mechanisms for producing males only in a medfly mass rearing system, the application of recombinant DNA and other biotechnological methods for controlling pests, the development of computer simulation models for pest population dynamics and procedures for using computers in data collection and analysis, and the optimization of the application of SIT and other biocontrol systems for controlling the medfly.

D/83. In the period 1987-88, it is planned to conduct two CRPs, one training course and one symposium (1988). In addition, some 15 TC projects will be executed, including large-scale field applications of the SIT in Egypt and Peru.

D/84. Output: Transfer to developing countries of effective pest control technology.

Project D.2.02

Development of practices and establishment of capabilities for eradication or control of tsetse flies and other blood-sucking insects by the sterile insect technique and related biotechnological methods

D/85. Objective: To assist developing Member States in using nuclear and related biotechnological methods for the control or eradication of tsetse flies and other blood-sucking insects.

D/86. Addressee: National authorities responsible for tsetse control operations, rural development and atomic energy, research and other institutions dealing with pest management, relevant international organizations (FAO).

D/87. Main means of achieving objective: Supporting research and development, meetings, supplying experts and equipment, training, laboratory services.

D/88. Project planning and duration: Project activities will focus on developing and improving methodologies for mass rearing species of tsetse targeted for eradication by the SIT, developing artificial diets and optimizing their use for tsetse mass rearing and developing effective prerelease population suppression techniques for tsetse that involve minimal use of insecticides. Furthermore, in collaboration with the Division of Life Sciences, the SIT will be developed for use against mosquitoes as vectors of malaria, and suitable methods will be developed for separating the sexes in mosquitoes so as to ensure that males only are released during an SIT campaign.

D/89. In 1987-88, it is planned to conduct one CRP, one training course and 4-6 TC projects, including 2-3 large-scale field applications of the SIT: the large-scale tsetse project (BICOT) in Nigeria will be completed in 1986 and a second phase covering some 10-15 000 km^2 is under preparation.

D/90. Output: Transfer to developing countries of effective pest control technology.

PROBLEM II

D/91. Unacceptable adverse effects on man, the environment and the economy as a result of the injudicious use of agrochemicals.

ASSESSMENT AND ANALYSIS

D/92. To meet the need for the intensification of agriculture in order to produce more food, pesticide use in developing Member States is rapidly increasing. However, injudicious use of pesticides can have adverse effects on applicators and others exposed or can result in pollution of the environment and contamination of food sources. It is important to make efforts to overcome these problems. Radioisotopes are an essential tool in studies of the metabolism of pesticides and their environmental fate. Furthermore, radioisotopes can also be employed in studies aimed at reducing the use of insecticides and producing formulations which minimize environmental contamination.

ROLE OF THE AGENCY

D/93. The Agency has experience and expertise in isotope-aided pesticide chemistry, analytical chemistry, residue and metabolite investigations, formulation chemistry and bioassay techniques and is thus able to assist Member States in achieving a high level of performance in applying the relevant nuclear and related techniques.

Project D.2.03

To assist in establishing national capabilities for monitoring pesticide residues in food and the environment

D/94. 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 use.

D/95. Addressee: National authorities responsible for the use and regulation of agrochemicals, atomic energy and environmental protection authorities, the pesticide industry and relevant international organizations (WHO, FAO).

D/96. Main means of achieving objective: Supporting research and development, meetings, supplying experts and equipment, training, laboratory services, publishing reports.

D/97. Project planning and duration: Work will be conducted through CRPs and technical co-operation activities which will focus on the development and improvement of methods for measuring contaminants and ascertaining their fate in food, feed, soil, water and biota, the development and improvement of methods for formulating agrochemicals to reduce environmental contamination and the development of alternative chemical approaches to pest control, including insect attractant-toxicant combinations.

D/98. In the period 1987-88, it is planned to conduct six CRPs, one training course and one symposium (1987). In addition, some 10-12 TC projects will be implemented.

D/99. Output: Increased capability for developing and monitoring the efficient and safe use of pesticides and for investigating alternative methods.

PROBLEM III

D/100. Post-harvest losses and contamination of food.

ASSESSMENT AND ANALYSIS

D/101. Food losses occur during various stages of distribution from the field to consumer and vary among different crops. It is estimated that the losses range from 10 to 20% for durable food (e.g. cereals and pulses), 20-40% for semi-perishables (e.g. tubers and bulbs, dried food) and up to 50% for perishables (fresh fruit and vegetables, fish and meat). The total estimated value of these crop losses per annum is approximately US$ 13 billion. In addition, certain food commodities are occasionally contaminated by chemical fumigants, pathogenic microorganisms and parasites which could result in food-borne infection and intoxication among consumers. International trade in these commodities is hampered by the frequent rejection by importing countries of these commodities because of the risk of contamination.

D/102. Irradiation represents an effective and in some cases unique tool for reducing post-harvest food losses or eliminating pathogenic organisms in food and is increasingly recognized as a possible substitute for certain fumigants for disinfesting and disinfecting food which have been or are likely to be prohibited.

D/103. There are, however, a number of obstacles to be overcome before food irradiation is widely applied. In many Member States and particularly in several major importing countries, health regulations do not permit the import of, or in some cases internal trade in, irradiated food. Also, there is a need to establish the research and manpower capacity and other infrastructure required to support the operation of irradiation facilities and to assess the viability of introducing commercial food irradiation in the specific conditions of individual countries.

ROLE OF THE AGENCY

D/104. As an international organization, the Agency can, in co-operation with other organizations such as FAO, WHO and ITC - UNCTAD/GATT and with the assistance of the recently established International Consultative Group on Food Irradiation, provide information leading to wider acceptance of food irradiation. Furthermore, it can help Member States set up national regulations, advise on the overall infrastructure required and train personnel, in particular through the International Facility for Food Irradiation Technology. It can also review the latest technological developments and compare the economic competitiveness of irradiation with other food preservation technologies.

Project D.2.04

Preparation for the commercial use of food irradiation

D/105. Objective: To facilitate the introduction of food irradiation on a commercial scale.

D/106. Addressee: National authorities responsible for food research and nuclear applications for food preservation, food industry and relevant international organizations (e.g. FAO, WHO, ITC - UNCTAD/GATT).

D/107. Main means of achieving objective: Meetings, supplying experts, training, supporting research and development, publishing reports.

D/108. Project planning and duration: In anticipation of wider acceptance of food irradiation technology, work will concentrate on the general and country-oriented assessment of the feasibility, effectiveness and comparative economic advantages of food irradiation, providing advice on the technical and legal infrastructure required by Member States to initiate and operate food irradiation programmes, training scientists and assisting with the establishment of national food irradiation facilities.

D/109. In 1987-88, it is planned to conduct three CRPS, two training courses, one advisory meeting and some 15 TC projects per annum. A regional seminar for Africa will be held in 1987.

D/110. Output: Recommended criteria for setting up commercial-scale food irradiation programmes in Member States and improved preparedness and capability to install and operate food irradiation facilities.

Project D.2.05

Acceptance of irradiated food in trade

D/111. Objective: 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 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/112. Addressee: National authorities responsible for food control and regulation, food industry, relevant international organizations (FAO, WHO).

D/113. Main means of achieving objective: Meetings.

D/114. Project planning and duration: In view of the facts that a chemical fumigant has recently been prohibited, that there is increasing concern about the safety of other fumigants and that salmonella contamination of imported food is a problem, a solution to the question of acceptance of irradiated food is urgently required. While some time may be needed to solve the problem completely, it is expected that a major breakthrough could be achieved by the end of 1987. An international conference is planned for 1988.

D/115. Output: Increased export and trade opportunities for fruit and other food commodities produced by developing countries.

Project D.2.06

Use of irradiation as an alternative to fumigation of food

D/116. Objective: To assess the effectiveness and feasibility of using irradiation as an alternative method to fumigation 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/117. Addressee: National authorities responsible for food protection and trade, the food industry and relevant international organizations (e.g. FAO, WHO, UNEP, ITC - UNCTAD/GATT).

D/118. Main means of achieving objective: Supporting research and development.

D/119. Project planning and duration: A review of the use of irradiation as an alternative to fumigation of food will be carried out in 1987. A CRP on the use of irradiation as a quarantine treatment for agricultural commodities, especially those originating from developing countries, will continue until 1989.

D/120. Output: Acceptance of irradiation as an alternative to chemical fumigants by health authorities and the food industry.

Summary of budget estimates by Area of Activity

Table 16

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
D.1. Agricultural Production	2 727 000	64 000	2.3	2 791 000	35 000	1.3	2 826 000	3.8	2 896 000	4.9	3 078 000
D.2. Agricultural and Food Protection	2 375 000	(41 000)	(1.7)	2 334 000	17 000	0.7	2 351 000	3.7	2 421 000	4.8	2 556 000
Programme D Total	5 102 000	23 000	0.5	5 125 000	52 000	1.0	5 177 000	3.7	5 317 000	4.9	5 634 000

Summary of main means by Area of Activity

Table 17

Area of Activity	Man-years P	Man-years GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	TC support & advisory services	Total	Responsible Division
	1987/1988 Estimates (Regular Budget)										
D.1. Agricultural Production	17.2 [14.0]	8.2 [16.8] [15.8]M&O	214 000	7 000	863 000	-	-	2 090 000	2 800 000	5 974 000	RIFA
D.2. Agricultural and Food Protection	16.8 [10.0]	7.8 [12.8] [13.8]M&O	255 000	-	510 000	-	-	1 922 000	2 290 000	4 977 000	RIFA
Programme D Total	34.0	16.0	469 000	7 000	1 373 000	-	-	4 012 000	5 090 000	10 951 000	

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

D. FOOD AND AGRICULTURE

Programme Area 2: List of projects and estimated resources for 1987/1988

Table 18

	Project	Estimated Resources for 1987/1988			
		Regular Budget	TC resources	Extra-budgetary resources a/	Total
Programme D	FOOD AND AGRICULTURE				
Area of Activity					
D.1.	Agricultural Production				
D.1.01	To strengthen research capabilities for optimizing the use of water, fertilizers and other agrochemicals	647 000	1 424 000	71 000	2 142 000
D.1.02	Through the use of isotope techniques, to facilitate research aimed at enhancing biological nitrogen fixation	1 524 000	3 184 000	367 000	5 075 000
D.1.03	To facilitate research to improve crop production in salt-affected soils	348 000	754 000	45 000	1 147 000
D.1.04	Maintaining a data bank for induced mutant germ plasm resources	343 000	460 000	54 000	857 000
D.1.05	To assist the development and acquisition of skills and capabilities to improve cultivars through mutation breeding and related biotechnological methods	1 603 000	2 010 000	416 000	4 029 000
D.1.06	To establish and strengthen research capabilities for optimizing the reproductive efficiency of livestock through the use of RIA and related techniques	499 000	1 080 000	169 000	1 748 000
D.1.07	To establish and enhance capabilities for improving the nutrition of ruminant livestock through the use of nuclear and related techniques	381 000	770 000	471 000	1 622 000
D.1.08	To strengthen capabilities for controlling livestock diseases through the use of radiation, immunoassay and related biotechnological methods	275 000	852 000	891 000	2 018 000
D.1.09	To study the fate of trypanocidal drugs in African cattle using radioisotopes	152 000	950 000	48 000	1 150 000
D.1.10	Assessment of data and research on the use of indigenous organisms for the bioconversion of agricultural residues and wastes into animal feeds and plant nutrients	202 000	358 000	70 000	630 000
D.1.	Sub - Total	5 974 000	11 842 000	2 602 000	20 418 000
D.2.	Agricultural and Food Protection				
D.2.01	Establishment of capabilities for control or eradication of fruit flies and other insect crop pests using the sterile insect technique and related biotechnological methods	1 662 000	14 130 000	533 000	16 325 000
D.2.02	Development of practices and establishment of capabilities for eradication or control of tsetse flies and other blood-sucking insects by the sterile insect technique and related biotechnological methods	910 000	2 109 000	289 000	3 308 000
D.2.03	To assist in establishing national capabilities for monitoring pesticide residues in food and the enviroment	1 184 000	1 015 000	458 000	2 657 000
D.2.04	Preparation for the commercial use of food irradiation	611 000	1 690 000	302 000	2 603 000
D.2.05	Acceptance of irradiated food in trade	292 000	-	71 000	363 000
D.2.06	Use of irradiation as an alternative to fumigation of food	318 000	-	71 000	389 000
D.2.	Sub - Total	4 977 000	18 944 000	1 724 000	25 645 000
Programme D	Food and Agriculture	10 951 000	30 786 000	4 326 000	46 063 000

a/ Includes funds from other UN organizations.

PROGRAMME E: HUMAN HEALTH

Area of Activity E.1
Nuclear Medicine

PROBLEM I

E/1. Need to strengthen radionuclide-based laboratory analytical services in medical institutions in developing countries.

ASSESSMENT AND ANALYSIS

E/2. Radionuclide-based laboratory analytical techniques, especially radioimmunoassay and related procedures, are currently of enormous importance in medical research and diagnosis throughout the world. Among the medical applications of radionuclides, this type is of particular importance in developing countries because the cost and level of technological sophistication are typically lower than applications involving administration of radionuclides to patients.

E/3. Laboratories in developing countries experience distinctive problems in the use of these techniques. The disease spectrum, for example, is different from that in developed countries and includes parasitic and infectious diseases. Analytical techniques not yet perfected in developed countries therefore have to be devised or improved. Reagents pose another problem. In order to reduce costs and unreliability of supply associated with the importation of commercial kits, local production and distribution of selected reagents would be advantageous. Furthermore, conditions of work pose greater threats to the integrity of reagents and equipment than is common in developed countries, yet awareness of and access to effective quality control are often lacking. Quality control procedures of all types must thus be strengthened. Finally, as specialist skills are less readily available than in developed countries, training is of vital importance.

ROLE OF THE AGENCY

E/4. The Agency can assist medical laboratories in developing countries to strengthen their radionuclide-based analytical services in all of these respects, using the mechanisms of technical co-operation, CRPs and information exchange. Close contact will be maintained with WHO (in particular the Special Programmes for Research and Training in Tropical Diseases and for Research in Human Reproduction).

Project E.1.01

To establish and strengthen indigenous capabilities for the reliable and inexpensive performance of routine in vitro assays

E/5. Objective: To help set up laboratories in hospitals in developing countries for routine diagnostic assay procedures utilizing radionuclides, to

develop indigenous technical expertise for the production of the reagents required within a country or a region and to promote appropriate quality control measures for the proper conduct of these assays.

E/6. Addressee: Hospitals and medical institutions in developing countries.

E/7. Main means of achieving objective: Supplying equipment and experts, training, supporting research and development.

E/8. Project planning and duration: In 1987 and 1988, it is expected that the Agency will assist in establishing or upgrading about 50 laboratories for routine diagnostic assay procedures using radionuclides in hospitals.

E/9. Under regional programmes in Asia and the Pacific and in Latin America, emphasis will be given to reducing the cost and upgrading the quality of the analysis of thyroid-related hormones through improved reagent supply, the use of improved software, better quality control and extensive training at the national level.

E/10. Output: Improved quality and quantity, and lower cost, of diagnostic tests employing radionuclides in vitro.

Project E.1.02

Development of in vitro nuclear techniques for the diagnosis of communicable diseases

E/11. Objective: To develop radionuclide-based in vitro techniques for the diagnosis of and epidemiological studies on communicable diseases such as schistosomiasis, filariasis, malaria and tuberculosis.

E/12. Addressee: Medical institutions in developing countries involved in research on parasitic and infectious diseases.

E/13. Main means of achieving objective: Supporting research and development, training, supplying experts.

E/14. Project planning and duration: A CRP on tuberculosis will commence in 1987, with 12 institutes in the Asian region participating. Diagnostic kits for tuberculosis will be produced and distributed to all participants by one centre in the region. The procedures for using these diagnostic kits will be standardized.

E/15. A second CRP on schistosomiasis will also be initiated in 1987, with 12 institutes participating. Diagnostic kits will be produced and supplied by one advanced institution. This programme will follow up the work of the CRP on the detection of parasite antigens in host body fluids but will include radiation-immobilized monoclonal antibody methods.

E/16. Regional seminars in 1987 (Africa) and 1988 (Asia and the Pacific) and two regional training courses in Asia and Africa are planned.

E/17. Output: Enhanced ability to use appropriate nuclear techniques for specific communicable diseases which are prevalent in developing countries.

Project E.1.03

To optimize and apply nuclear techniques for the survey of thyroid function in endemic goitre areas

E/18. Objective: To develop optimal nuclear techniques for investigating thyroid function in endemic goitre areas and to investigate neonatal thyroid deficiency in these regions.

E/19. Addressee: Developing countries, many of which have endemic goitre regions as a result of dietary iodine deficiency.

E/20. Main means of achieving objective: Supporting research and development, meetings.

E/21. Project planning and duration: The project will follow up current work on the optimization of thyroid function investigations which is due to end in 1986 and will concentrate on endemic goitre areas. An advisory group meeting will be convened in 1987 and a CRP formulated on the basis of its recommendations.

E/22. Output: Clarification of the nature and magnitude of thyroid function disorders in endemic goitre areas so as to stimulate remedial measures.

PROBLEM II

E/23. Need to strengthen in vivo nuclear medicine services in medical institutions in developing countries.

ASSESSMENT AND ANALYSIS

E/24. The administration of radionuclides to persons for purposes of diagnosis as well as of research and therapy is a very common medical procedure in developed countries. It is becoming progressivley more common in developing countries as equipment, radionuclides and skills become more widely available. Medical institutions in developing countries have difficulty in effectively integrating nuclear medicine into their clinical services for a number of reasons. Because the disease spectrum is different from that in developed countries (fewer malignant and degenerative diseases and more parasitic and communicable diseases), techniques not fully investigated in developed countries require attention. Furthermore, the high cost of equipment and its vulnerability to frequent and prolonged breakdown demand care in its selection, siting and maintenance. Radiopharmaceuticals pose another problem since many are best prepared in the hospitals where they are to be used. Finally, there is a need to improve quality control and to develop specialized skills, which are often lacking, to ensure the most effective use of the resources available.

ROLE OF THE AGENCY

E/25. The Agency can assist medical institutions in developing countries to strengthen their clinical nuclear medical services through the mechanisms of CRPs, technical co-operation and information exchange. Close contact will be maintained with WHO.

Project E.1.04

Development of indigenous nuclear medicine resources, including the acquisition of instrumentation and skills and the production of reagents.

E/26. Objective: To help in establishing nuclear medicine centres for in vivo diagnostic studies in developing countries and to promote the more effective use of nuclear medicine techniques.

E/27. Addressee: Hospitals in developing countries where nuclear medicine facilities provide a non-invasive, versatile, relatively inexpensive diagnostic service.

E/28. Main means of achieving objective: Supplying equipment and experts, training, meetings, publishing reports.

E/29. Project planning and duration: In 1987 and 1988, it is expected that the Agency will assist in establishing or upgrading about 30 laboratories for the performance of routine nuclear medicine in vivo. The gradual trend towards more sophisticated methods and instruments for non-invasive diagnostic procedures in nuclear medicine is likely to expand sharply during this period, resulting in a need for increased expert services. In parallel with the envisaged expansion of technical assistance, recipient nuclear medicine centres will be encouraged - through local or regional activities - to participate in providing training and assistance for their own country or region and to contribute more to regional co-operation.

E/30. A symposium on applications of dynamic functional studies with radioisotopes in nuclear medicine in developing countries and a seminar on training in nuclear medicine in developing countries are planned for 1988.

E/31. Output: Acceleration and enlargement of the scope of nuclear medicine techniques in developing countries.

Project E.1.05

Development of capabilities in quality control and maintenance of nuclear medicine equipment.

E/32. Objective: To establish proper methods for the quality control of nuclear medicine equipment and to develop means of maintaining them in developing countries.

E/33. Addressee: Nuclear medicine centres in hospitals in developing countries.

E/34. Main means of achieving objective: Publishing guidelines, training, supplying experts and equipment, supporting research and development.

E/35. Project planning and duration: The more complicated instruments likely to be provided by the Agency to institutes in developing countries in the near future must be accompanied by extensive expert services in order to make the recipient institutes more independent in maintaining proper quality control. Two regional workshops on quality control of nuclear medicine instruments will be held in Asia, Latin America or Africa, leading by 1988 to the establishment of national programmes which integrate instrument quality control with repair and maintenance facilities. A related technical document will be published in 1987 and made available to all participating nuclear medicine centres. Three CRPs aimed at setting up national QC programmes will be completed in 1988. A CRP on the quantitative evaluation of nuclear imaging for liver disease will continue until 1987.

E/36. Output: Optimum utilization of resources provided to developing countries.

Project E.1.06

Development of nuclear techniques in dynamic studies of lung function

E/37. Objective: To establish imaging studies of lung function with radioaerosols, especially for diseases such as pulmonary tuberculosis which are prevalent in developing countries.

E/38. Addressee: Nuclear medicine services in developing countries where chronic respiratory diseases are common and where radioactive inhalation gases are not readily available for lung imaging.

E/39. Main means of achieving objective: Supplying equipment, supporting research and development, training.

E/40. Project planning and duration: On the basis of the recommendations of a consultant's meeting in 1986, a CRP will be initiated in 1987 with 12 participants from Asia and the Pacific. At the start of the CRP all participants will be provided with a simple and reliable radioaerosol system for imaging studies of lung function and training will be organized for participants experiencing difficulty in establishing the technology at their institutes.

E/41. Output: Establishment of effective, useful and inexpensive diagnostic techniques for chronic pulmonary diseases prevalent in developing countries.

PROBLEM III

E/42. Need for developing countries to evolve an optimum diagnostic strategy regarding in vitro and in vivo nuclear and non-nuclear techniques.

ASSESSMENT AND ANALYSIS

E/43. Radionuclide procedures for research and diagnosis compete both with each other and with a wide spectrum of alternative techniques in a scientific and technological framework which is rapidly evolving. In laboratory analytical techniques, many types of radionuclide test exist and are in competition with tests exploiting alternative labels such as enzymes and chemiluminescent or fluorescent substances. In imaging, numerous nuclear medicine techniques compete with each other as well as with alternative procedures such as ultrasound, radiography and nuclear magnetic resonance. The costs of these alternative procedures are different and their relative costs in developing and developed countries may also differ. Similarly, the medical usefulness varies from one disease condition to another and may therefore be different in developing and developed countries. It is important for medical institutions in developing countries to be able to choose among alternative techniques on the basis of sound and up-to-date information concerning both cost and effectiveness.

ROLE OF THE AGENCY

E/44. It is appropriate for the Agency to assess and be aware of alternative procedures in selected problems of medical research and diagnosis so as to help identify those whose cost and effectiveness are most favourable in the conditions of developing countries. This will include the comparison of alternative nuclear medicine techniques with each other as well as of radionuclide versus non-radionuclide techniques. Mechanisms will include predominantly CRPs but experience gained from TC projects will also be studied. Co-operation will be maintained with WHO.

Project E.1.07

Assessment of the status and cost-effectiveness of competing radionuclide and non-radionuclide procedures for medical research and diagnosis in developing countries

E/45. Objective: To develop optimum diagnostic strategies for developing countries through appropriate evaluation of in vitro and in vivo nuclear and non-nuclear techniques.

E/46. Addressee: Hospitals and medical institutions in developing countries.

E/47. Main means of achieving objective: Meetings, supporting research and development.

E/48. Project planning and duration: A consultants' meeting will be convened early in 1987 on the status and cost-effectiveness of radionuclide and non-radionuclide procedures for medical research and diagnosis. On the

basis of its recommendations, two CRPs will be initiated in 1987 to compare radionuclide and other procedures such as computer-assisted tomography, ultrasound, enzyme and fluoroscent tracers.

E/49. Output: Cost-effective diagnostic strategy for various clinical problems in developing countries where resources are scarce and choices limited.

Area of Activity E.2
Applied Radiation Biology and Radiotherapy

PROBLEM I

E/50. Need to establish the infrastructure for and expertise in the application of radiobiological techniques in human health and nutrition

ASSESSMENT AND ANALYSIS

E/51. The improvement of human health standards in most developing Member States depends upon the early improvement of their existing health-care systems. Ready availability of sterile medical supplies (including biological tissue grafts) to provide safe cross-infection-free clinical services to patients, the provision of adequate radiotherapy facilities to control cancer, and the enrichment of the nutritional quality of the staple diet are among the major factors which could contribute to such an improvement. Radiobiological techniques have the potential to improve the effectiveness of these fields. The microbicidal effects of penetrating ionizing radiation form the basis of the sterilization of prepacked ready-to-use local medical supplies, including tissue grafts. Radiobiology and the factors of radiation response in cancerous and normal cells and tissues provide the operational criteria and guidelines for improved radiotherapy of cancer. Radiation-induced mutations for genetically improved microorganisms to ferment starch-based diets such as cassava in developing countries, together with nuclear analytical tools to further modify the biochemistry involved, are promising methods for the nutritional upgrading of indigenous dietary final products.

E/52. To derive optimal benefit from the application of radiobiological techniques, it is essential to develop suitable practices and guidelines on criteria, including quality control, to meet local needs and to develop the proper infrastructure.

ROLE OF THE AGENCY

E/53. Through CRPs, training and dissemination of information on radiation biology applications, the Agency has helped to upgrade human health standards in many developing countries. It has also helped to establish a number of ^{60}Co gamma radiation facilities of industrial and semi-industrial capacities and to introduce other radiation units for radiotherapy research, process development and pilot-scale studies. In order to obtain the best results from these radiation sources, there is a need to strengthen local expertise in radiobiology and radiotherapy. The Agency will draw up suitable guidelines and a code of practice on health safety quality control criteria and will continue to provide equipment and experts through TC projects.

Project E.2.01

Establishment of skills and capabilities for radiation sterilization of medical supplies including biological tissue grafts

E/54. Objective: To promote the effectiveness of, and to upgrade, national health-care services, particularly in developing countries, by establishing an indigenous capability to produce prepacked ready-to-use radiation-sterilized medical supplies, including pharmaceuticals and biological tissue grafts, suitable for safe cross-infection-free clinical use under local conditions.

E/55. Addressee: National health authorities responsible for safety and regulatory guidelines in public health-care services, companies manufacturing local medical supplies.

E/56. Main means of achieving objective: Supporting research and development, publishing reports, training, supplying experts and equipment.

E/57. Project planning and duration: Expertise in radiation microbiology and the establishment of the infrastructure required for the radiation sterilization of prepacked local medical and pharmaceutical supplies in Africa and the Middle East regions will be promoted through manpower training and research relevant to local conditions and health-safety criteria for patients. Local technical capability in Asia and the Pacific region will be expanded so that their radiation sterilization practices can be effectively adapted to include the sterile processing of prepacked biological tissue grafts for safe clinical use in rehabilitative surgery. A seminar on new approaches in the practices and process technology for radiation sterilization of medical supplies is planned for 1988.

E/58. Output: Improved technical protocol for sterilizing radiation dose setting for local medical supplies, pharmaceuticals and biological tissue grafts in developing country conditions and revised IAEA code of practice for use by national health regulatory authorities.

Project E.2.02

Assessment of the potential of nuclear techniques to improve fermentation processing of cassava

E/59. Objective: To develop and evaluate the technical feasibility and potential of radiation biology techniques for improving the traditional cassava fermentation process to produce an increased yield of nutrient proteins in the final product.

E/60. Addressee: National radiation biology research centres concerned with health-care and nutrition control; International Cell Research Organization (ICRO) and other international and national organizations concerned with food and nutrition problems.

E/61. Main means of achieving objective: Supporting research and development, training, laboratory services.

E/62. Project planning and duration: The development and assessment of suitable nuclear techniques and other applications of radiation biology and radiation mutagenesis will continue until 1988 through a CPR and training. The technical protocol for improved fermentation will be handed over to national institutes in the regions for further evaluation studies and applications. The project will be implemented in co-operation with the Joint FAO/IAEA Division.

E/63. Output: Improved practices and techniques for cassava fermentation to yield nutritionally enriched products.

Project E.2.03

Development of skills and infrastructure needed for intracavitary radiotherapy of cancer of the cervix

E/64. Objective: To build up and improve health-care services in developing countries for the treatment and control of cancer of the cervix through development of facilities for and local expertise in intracavitary radiotherapy.

E/65. Addressee: National health authorities, national and international organizations concerned with cancer control campaigns, national radiotherapy centres.

E/66. Main means of achieving objective: Supplying experts and equipment, training.

E/67. Project planning and duration: The Agency will help to set up national radiation therapy centres through its TC programme by supplying the necessary radiotherapy equipment, experts and training for local personnel to gain expertise in clinical radiotherapy and in the maintenance of equipment. The successful implementation of the project will yield further improvement in anti-cancer measures and therapeutic practices in the recipient Member States.

E/68. Output: Increased ability to carry out external and intracavitary radiotherapy of cervical cancer and other forms of neoplasia.

Project E.2.04

Assessment of the potential of intracavitary neutron irradiation and combined therapy

E/69. Objective: To develop and evaluate the potential clinical advantages of combined therapy and high linear energy transfer (LET) neutron radiation for intracavitary and interstitial radiotherapy of cancer.

E/70. Addressee: National health authorities, national cancer research and radiotherapy centres, international and national organizations concerned with cancer control campaigns.

E/71. Main means of achieving objective: Supporting research and development, supplying experts and equipment.

E/72. Project planning and duration: Suitable neutron sources such as ^{252}Cf seeds and needles will be supplied to participating institutes in the developing countries and training will be provided for radiotherapists and medical physicists from these countries in neutron brachytherapy and neutron dosimetry (treatment planning). Meetings will be held to review and co-ordinate results and to facilitate the early application of radiotherapy for cancer treatment. Two CRPs on combined therapy will be completed in 1987.

E/73. Output: Basis for evaluation of comparative advantages of high LET neutron radiation in radiotherapy for cancer treatment.

Area of Activity E.3
Radiation Dosimetry

PROBLEM I

E/74. Need to establish the infrastructure and expertise required for reliable measurement of radiation doses in radiation therapy, radiation processing and radiation protection and to establish measurement traceability.

ASSESSMENT AND ANALYSIS

E/75. In all applications of radiation, it is important that the required dose be delivered accurately, either for legal (limited doses in radiation processing), health (radiotherapy) or technical (radiation sterilization and food irradiation) reasons. A prerequisite for accurate dose delivery is proper dose measurement. A statistical evaluation carried out by the Agency over the last six years has shown that dosimetry is inadequate in 40% of the radiation therapy facilities which use ^{60}Co sources. Periodic calibrations of radiation measurement instruments as quality assurance programmes have become legal requirements in many Member States. As increasing use is made of electron accelerators, the need for dosimetric quality assurance in radiation therapy is increasing. In addition, more than 250 gamma and electron radiation processing facilities are now in operation in 51 countries - many of them developing ones - and the number of such facilities is growing rapidly.

ROLE OF THE AGENCY

E/76. In 1976, the Agency and WHO set up an international network of Secondary Standard Dosimetry Laboratories (SSDLs). This network is guided by a secretariat run jointly by the two organizations. A standing SSDL Scientific Committee reviews and provides technical advice on the activities of the network. The Agency assists in the design of SSDLs and provides special equipment, manuals and training for SSDL staff. The Agency's Dosimetry Laboratory organizes dose intercomparisons among member laboratories and serves as the central, co-ordinating laboratory of the network. In addition, traceability of measurements to the primary standards of the Bureau International des Poids et Mesures (BIPM) is provided through this laboratory.

E/77. For countries where no SSDL exists, a special dose intercomparison service for radiotherapy is being offered. While WHO selects radiation therapy centres for participation in dose intercomparisons through its regional offices, the Agency is responsible for all technical aspects of this service.

E/78. Agency activities to achieve standardization of dosimetry for radiation processing were initiated in 1977 and are now executed under the "Agreement Concerning the Provision of a Dose Assurance Service by the IAEA to Irradiation Facilities in its Member States", concluded in 1985.

Project E.3.01

Development and monitoring of the SSDL network

E/79. Objective: To operate and further develop a network of Secondary Standard Dosimetry Laboratories in Member States, and to raise the level of work performance of existing SSDLs to internationally acceptable standards within the next ten years.

E/80. Addressee: Government authorities (e.g. nuclear energy, health, metrology) responsible for radiation dose control and measurement, national and international organizations and committees concerned with radiation measurement.

E/81. Main means of achieving objective: Publishing guidelines, supplying experts and equipment, training, laboratory services.

E/82. Project planning and duration: The Agency has helped to set up and operate about 50 SSDLs to date and the total number is expected to grow to about 70 in the next few years.

E/83. In 1987-88, it is expected that some 10 new SSDLs will be established. In the same period, assistance to improve the performance of existing SSDLs will continue by organizing two regional workshops, one training course and one regional seminar, preparing four to six information circular letters and one manual, and performing two intercomparison exercises by mail. In addition, a symposium on dosimetry in radiotherapy will be held in 1987.

E/84. Output: Improved efficiency and safety of medical and industrial radiation applications and more reliable radiation protection services.

Project E.3.02

Provision of dose intercomparison and assurance services

E/85. 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/86. Addressee: WHO Regional Centres, national health authorities, institutions operating radiation therapy and radiation processing facilities, international organizations or committees concerned with food preservation and radiation sterilization.

E/87. Main means of achieving objective: Laboratory services.

E/88. Project planning and duration: At present, dose intercomparisons involving about 200 radiotherapy centres are carried out annually using thermoluminescence dosimeters. Following the recommendation of an IAEA/WHO expert group, it is intended to increase the number of participating institutions to 300 (per year) during the period 1987-88. A dose assurance service for radiation processing facilities with Alanine dosimeters was started recently and 200 checks are planned for the period 1987-88.

E/89. Output: Through the above service, Member States can achieve dose assurance and thereby increase the reliability of radiation measurements.

Area of Activity E.4
Nutritional and Health-related Environmental Studies

PROBLEM I

E/90. Need to improve human health through better nutrition and protection from ill effects of environmental pollution caused by toxic elements.

ASSESSMENT AND ANALYSIS

E/91. Nuclear analytical techniques and isotope-aided tracer methods offer a powerful means of monitoring and assessing the nutritional status of human populations and their exposure to toxic pollutants. These techniques are not yet widely used for this purpose in many of the Agency's Member States, despite the existence of important problems to which they could usefully be applied. There is thus a need to further disseminate information on these techniques, to provide technical and financial support for their applications, and to provide analytical services.

E/92. The main applications of nuclear techniques which will be supported relate to the following topics: first, nutritional deficiencies of trace elements such as iron, iodine and selenium, which lead to ill health and/or poor physical and mental development; secondly, studies of protein, fat and carbohydrate metabolism using stable isotopes which, because they pose no radiological threat, may be used even in children and pregnant women; and thirdly, environmental and occupational exposure to toxic heavy metals and other non-radioactive pollutants.

E/93. Many Member States are not yet sufficiently aware of the possibilities for applying nuclear methods in such work. Also, many lack the

facilities, infrastructure and expertise required for such work or are producing results of unsatisfactory reliability because of the technical difficulties involved and insufficient training.

ROLE OF THE AGENCY

E/94. Through its contacts with international, governmental, academic and other institutions around the world, the Agency is in a position to assist specialized national research establishments to achieve a high level of performance in applying nuclear methods in the above-mentioned fields. Such assistance will be provided mainly through the mechanisms of CRPs, technical co-operation, training, information exchange and quality control services. The Agency already has extensive contacts with counterpart laboratories in many countries and expects to continue its collaboration in this area with international organizations such as WHO, WMO and UNEP.

E/95. Emphasis is placed in this area on the use of nuclear-related techniques such as activation analysis, X-ray fluorescence (XRF), particle-induced X-ray emission (PIXE) and isotope tracer techniques. These are to be supplemented, however, where appropriate, by non-nuclear methods such as atomic absorption spectrometry.

Project E.4.01

To assess and apply nuclear analytical techniques in selected nutritional research and to disseminate relevant information to developing Member States

E/96. Objective: To assess the role of, and to disseminate information on, nuclear methods applied in human nutritional research and to raise the level of performance of laboratories employing such methods, with particular reference to nutritional deficiencies occurring in some developing countries (essential trace elements, protein and so on).

E/97. Addressee: Government laboratories, universities and other national bodies involved in human nutritional research as well as relevant international organizations (WHO) and professional societies (International Union of Nutritional Sciences).

E/98. Main means of achieving objective: Supporting research and development, training, publishing reports, laboratory services.

E/99. Project planning and duration: During the period 1987-88, two CRPs will be conducted on dietary intakes of trace elements and applications of ^{13}C and ^{15}N in research on human malnutrition. One training course, four information circular letters, and three technical publications are planned.

E/100. Output: Wider and better use of nuclear methods in human nutritional research in developing countries.

Project E.4.02

To assess and apply nuclear analytical techniques in the monitoring of specific health-related environmental pollution

E/101. Objective: To assess the role of, and to disseminate information on, nuclear methods applied in health-related environmental research and to raise the level of performance of laboratories employing such methods, with particular reference to studies of toxic heavy metals in air, foodstuffs, water and human tissue.

E/102. Addressee: Government laboratories, universities and other national bodies involved in environmental and occupational health monitoring and research, relevant international organizations (WHO) and professional societies (IUPAC).

E/103. Main means of achieving objective: Supporting research and development, training, publishing reports, laboratory services, supplying experts.

E/104. Project planning and duration: During the period 1987-88, three CRPs will be conducted on the use of human hair for monitoring enviromental exposure, the monitoring of compliance with national and international regulations for maximum permissible concentrations of heavy metals in air, foodstuffs, etc., and pollution from coal-fly ash and other industrial wastes. A training course will be held and a training manual, four information circular letters and two technical reports will be published.

E/105. Output: Wider and better use of nuclear methods in environmental monitoring and research in developing countries.

Project E.4.03

Services to international pollution monitoring and research programmes

E/106. Objective: To assist Member States and international organizations involved in international pollution monitoring and research programmes by providing technical services available in the Agency's laboratories.

E/107. Addressee: National authorities and institutions and international organizations responsible for environmental pollution monitoring.

E/108. Main means of achieving objective: Laboratory services, training, meetings, development of reference analytical methods.

E/109. Project planning and duration: Collaborative work carried out by the Monaco Laboratory and UNEP involves studies of non-radioactive pollution of the sea (about nine heavy metals and five chlorinated hydrocarbons) and the development of reference analytical methods. Twelve intercalibration exercises per year will be organized by the Agency in support of laboratories in the Mediterranean, Kuwaiti, and Central and West African regions. About 300 samples per year will be analysed for heavy metals and 200 samples per year for chlorinated hydrocarbons. In-service training will be given to about

15 technical personnel from developing countries. Instrument maintenance services will be provided to about 20 institutes in the Mediterranean region. Laboratories in the Kuwaiti region will be given assistance in obtaining baseline data on the transport, fate and effects of specific marine pollutants.

E/110. Co-operative work with WMO involves analyses of toxic heavy metals and other elements (more than 10 altogether) in rainwater and air filter samples collected by WMO's background air pollution monitoring network (BAPMoN), which has some 150 stations around the world. The Agency's Laboratory will analyse about 500 specimens per year of rainwater and 120 air filters (about 9000 single element determinations in all), and will also provide training to four technical personnel per year from developing countries.

E/111. Output: Reports on the services and reference analytical methods provided and strengthened analytical capabilities in Member States.

Summary of budget estimates by Area of Activity

Table 19

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
E.1. Nuclear Medicine	913 000	(84 000)	(9.2)	829 000	65 000	7.8	894 000	3.5	858 000	4.4	966 000
E.2. Applied Radiation Biology and Radiotherapy	666 000	40 000	6.0	706 000	(28 000)	(4.0)	678 000	3.5	731 000	4.5	733 000
E.3. Radiation Dosimetry	738 000	87 000	11.8	825 000	(29 000)	(3.5)	796 000	3.4	853 000	5.0	864 000
E.4. Nutritional and Health-related Enviromental Studies	930 000	(94 000)	(10.1)	836 000	8 000	1.0	844 000	3.7	867 000	5.0	919 000
SNSP (Net)	-	189 000	-	189 000	(12 000)	6.3	177 000	3.5	195 000	4.8	192 000
Programme E Total	3 247 000	138 000	4.3	3 385 000	4 000	0.1	3 389 000	3.5	3 504 000	4.7	3 674 000

Summary of main means by Area of Activity

Table 20

Area of Activity	Man-years a/ P	Man-years a/ GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	SNSP (Net) b/	TC support & advisory services	Total	Responsible Division
	1987/1988 Estimates (Regular Budget)											
E.1. Nuclear Medicine	8.6	4.6	200 000	44 000	130 000	-	-	1 050 000	-	400 000	1 824 000	RILS
E.2. Applied Radiation Biology and Radiotherapy	8.6	4.6	90 000	-	135 000	-	20 000	839 000	-	380 000	1 464 000	RILS
E.3. Radiation Dosimetry	8.6 [0.4]	6.6 [3.2] [1.4]M&O	107 000	-	200 000	-	380 000	500 000	-	530 000	1 717 000	RILS
E.4. Nutritional and Health-related Environmental Studies	4.2 [2.4]	4.2 [9.0] [2.2]M&O	-	-	124 000	-	-	630 000	-	670 000	1 424 000	RILS
	3.0	4.0	-	-	-	-	-	362 000	-	-	362 000	RIML
Supplementary Nuclear Safety Programme SNSP (Net)	a/	a/	-	-	-	-	-	-	387 000	-	387 000	RILS
Programme E Total	33.0	24.0	397 000	44 000	589 000	-	400 000	3 381 000	387 000	1 980 000	7 178 000	

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

a/ Does not include possible additional manpower for the SNSP.

b/ The "main means" of implementing the SNSP have not yet been decided.

Programme Area 2: List of projects and estimated resources for 1987/1988

Table 21

	Project	Estimated Resources for 1987/1988			
		Regular Budget	TC resources	Extra-budgetary resources a/	Total
Programme E	HUMAN HEALTH				
Area of Activity					
E.1.	Nuclear Medicine				
E.1.01	To establish and strengthen indigenous capabilities for the reliable and inexpensive performance of routine in vitro assays	324 000	2 890 000	-	3 214 000
E.1.02	Development of in vitro nuclear techniques for the diagnosis of communicable diseases	328 000	308 000	-	636 000
E.1.03	To optimize and apply nuclear techniques for the survey of thyroid function in endemic goitre areas	87 000	-	-	87 000
E.1.04	Development of indigenous nuclear medicine resources including the acquisition of instrumentation and skills and the production of reagents	428 000	4 327 000	-	4 755 000
E.1.05	Development of capabilities in quality control and maintenance of nuclear medicine equipment	302 000	1 045 000	-	1 347 000
E.1.06	Development of nuclear techniques in dynamic studies of lung function	205 000	290 000	-	495 000
E.1.07	Assessment of the status and cost-effectiveness of competing radionuclide and non-radionuclide procedures for medical research and diagnosis in developing countries	150 000	-	-	150 000
E.1.	Sub - Total	1 824 000	8 860 000	-	10 684 000
E.2.	Applied Radiation Biology and Radiotherapy				
E.2.01	Establishment of skills and capabilities for the radiation sterilization of medical supplies including biological tissue grafts	532 000	322 000	-	854 000
E.2.02	Assessment of the potential of nuclear techniques to improve fermentation processing of cassava	443 000	209 000	-	652 000
E.2.03	Development of skills and infrastructure needed for intracavitary radiotherapy of cancer of the cervix	54 000	105 000	300 000	459 000
E.2.04	Assessment of the potential of intracavitary neutron irradiation and combined therapy	435 000	209 000	-	644 000
E.2.	Sub - Total	1 464 000	845 000	300 000	2 609 000
E.3.	Radiation Dosimetry				
E.3.01	Development and monitoring of the SSDL network	832 000	2 140 000	20 000	2 992 000
E.3.02	Provision of dose intercomparison and assurance services	885 000	90 000	20 000	995 000
E.3.	Sub - Total	1 717 000	2 230 000	40 000	3 987 000
E.4.	Nutritional and Health-related Envionmental Studies				
E.4.01	To assess and apply nuclear analytical techniques in selected nutritional research and to disseminate relevant information to developing Member States	482 000	293 000	-	775 000
E.4.02	To assess and apply nuclear analytical techniques in the monitoring of specific health-related environmental pollution	654 000	584 000	-	1 238 000
E.4.03	Services to international pollution monitoring and research programmes	288 000	46 000	-	334 000
	b) Monaco	362 000	-	841 000	1 203 000
E.4.	Sub - Total	1 786 000	923 000	841 000	3 550 000
	SNSP (Net)	387 000	-	-	387 000
Programme E	Human Health	7 178 000	12 858 000	1 181 000	21 217 000

a/ Includes funds from other UN organizations.

PROGRAMME F: INDUSTRY AND EARTH SCIENCES

Area of Activity F.1
Industrial Applications

PROBLEM I

F/1. Need to establish the infrastructure for, and expertise in, the application of radiation and isotopes to improve industrial processes.

ASSESSMENT AND ANALYSIS

F/2. Nuclear techniques are used world wide to improve the quality or economic benefit of industrial processes. Radioactive tracer methods are used to solve many industrial problems including, for example, flow measurements, trouble-shooting, process monitoring, process optimization and control and process design. Gammagraphy is an important part of non-destructive control techniques. Other applications include industrial radiation sterilization of medical supplies, modification of properties of plastics and the modification and improvement of the surface properties of different materials.

F/3. Nuclear techniques constitute only an alternative or supplementary tool for solving specific problems, however. In view of the rapid technological developments taking place, it is essential to know how competitive these techniques are and to continuously improve existing ones. Furthermore, new applications of radioisotopes and radiation are being introduced in various domains including biomedicine, bioengineering, biomass conversion and waste treatment.

F/4. Infrastructure development and dissemination of information on nuclear techniques are needed in developing Member States in particular. The transfer of radiation and isotope techniques is a complex process which requires considerable efforts to develop the necessary infrastructure, identify industrial opportunities and prepare industrial projects.

ROLE OF THE AGENCY

F/5. It is the Agency's role to evaluate the comparative status of nuclear and competing techniques, to assess the state of the art, to help disseminate information and to assist Member States in establishing laboratories for the development of applications of nuclear techniques.

Project F.1.01

Establishment of basis for the optimal utilization of radiation and isotope techniques in industry

F/6. Objective: To assess the status of the industrial applications of nuclear techniques and their competitiveness and to provide a forum for exchange of information on new applications and on the improvement of existing techniques.

F/7. Addressee: Governmental or independent organizations involved in radiation and isotope applications and related industrial sectors.

F/8. Main means of achieving objective: Meetings, supporting research and development, publishing reports and guidebooks.

F/9. Project planning and duration: There is a large variety of established industrial applications of nuclear techniques. Project activities will focus on assessing the status of, and promoting techniques and methodologies relating to, tracer applications, non-destructive testing and radiation chemistry and technology. With regard to tracer applications, emphasis will be placed on methods which will widen the range of applications for such purposes as solving problems in variable flow conditions and in the conservation of the environment. Existing methods such as tracer applications in process optimization will be improved in order to enhance the quality or productivity of industrial processes. In radiation chemistry and radiation technology new developments and trends will be assessed and the use of radiation technology for biomass utilization and conversion will be investigated.

F/10. Output: Improved use and better assessment of the economic implications of the applications of radiation and isotopes.

Project F.1.02

Technology transfer of the industrial applications of radiation and isotopes

F/11. Objective: To promote the transfer to developing Member States of technology relating to the industrial applications of radiation and isotopes.

F/12. Addressee: National authorities, independent organizations and industrial sector dealing with these technologies.

F/13. Main means of achieving objective: Meetings, supplying experts and equipment, training.

F/14. Project planning and duration: On the basis of past experience, developing Member States are expected to submit requests for assistance to increase their ability to make use of the industrial applications of nuclear methods such as tracer techniques, radiation processing and non-destructive testing. It is expected that in the period 1987-88 about 50-70 TC projects will be executed and 12 interregional or regional training courses organized. A seminar for Latin America on industrial radiation applications will be held in 1988.

F/15. Output: Laboratory and research facilities, programme of development, trained personnel, and a broader range of industrial applications in Member States.

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

PROBLEM I

F/16. Need to establish capabilities and capacities in the use of nuclear techniques for the exploration and assessment of water resources.

ASSESSMENT AND ANALYSIS

F/17. When used in conjunction with conventional hydrological methods, isotope and nuclear techniques often constitute a powerful tool of investigation through which a much improved understanding of hydrological systems can be obtained. Variations in the environmental isotope concentration of natural waters and other natural compounds, the behaviour of tracers artificially injected into surface waters and groundwater and the interaction of radiation with water and rocks can be used to determine certain characteristics of water bodies and of water-bearing formations. This allows the formulation of hypotheses on the behaviour of natural waters and on their response to exploitation and makes it possible to identify problems and failures which may arise.

ROLE OF THE AGENCY

F/18. With the experience and expertise it has accumulated, the Agency can help developing Member States to identify hydrological problems which can be tackled with isotope and nuclear techniques, to plan studies and to interpret the data obtained. The Agency also assists Member States in establishing their own laboratory capabilities for using isotope techniques in hydrology and geochemistry or, if these capabilities are not available, the Agency provides all the necessary analytical services through its Isotope Hydrology Laboratory.

F/19. In order to improve the efficiency of its services, the Agency co-ordinates its programme with other United Nations organizations using conventional techniques for the assessment of water resources.

Project F.2.01

Exchange of information on isotopic methods in the assessment of water resources

F/20. 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 resources.

F/21. Addressee: Institutes of hydrology, hyrogeology, geochemistry and environmental studies.

F/22. Main means of achieving objective: Meetings, publishing reports, supporting research and development.

F/23. Project planning and duration: In 1987, a symposium on isotope hydrology will be held and a regional seminar will be organized for Latin America (upon completion of the CRP on the application of isotope techniques in hydrology in the Latin American region) on the use of isotope techniques in geothermal exploration.

F/24. Output: Up-to-date information on the use of isotope methods in the evaluation of water resources.

Project F.2.02

Technology transfer in the use of nuclear techniques in the assessment of water resources

F/25. Objective: To strengthen Member States' ability to use isotope techniques in hydrological investigations.

F/26. Addressee: Institutes of hydrology and hydrogeology.

F/27. Main means of achieving objective: Supplying experts and equipment, training, analytical laboratory services.

F/28. Project planning and duration: During the period 1987-88, the Agency expects to execute an average of 40-50 TC projects relating to hydrological field investigations using isotope technques. These investigations will concern the origin, age and flow patterns of groundwater and geothermal waters and the dynamics of surface water (such as dispersion and mixing in rivers and lakes, leakage from dams and canals, river discharge, sediment transport in rivers, estuaries and the ocean). In some projects, the aim will be to set up isotope hydrology laboratories in Member States.

F/29. Output: Creation of infrastructure and capability to use nuclear techniques to assess water resources.

Project F.2.03

Provision of analytical and intercalibration services

F/30. Objective: To provide assistance in the determination of the isotope composition of natural waters and in the performance of intercalibration measurements among laboratories.

F/31. Addressee: Water organizations and isotope hydrology laboratories.

F/32. Main means of achieving objective: Meetings, publishing reports, laboratory services.

F/33. Project planning and duration: Analytical services will continue to be provided by the Agency's isotope hydrology laboratory in connection with some 50 TC projects carried out in countries where such analytical facilities are not available.

F/34. In conjunction with WMO, 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, will be published at intervals of 3-4 years: the last issue appeared in 1986.

F/35. Consultants' meetings will be organized on the intercalibration of isotopic measurements and of chemical and isotopic analyses of geothermal fluids. Samples will be prepared and distributed in order to intercalibrate isotopic measurements among some 70 laboratories.

F/36. Output: Increased quantity of, and more reliable, isotope hydrology data.

Project F.2.04

Study of water resources in Africa with emphasis on arid and semi-arid zones.

F/37. Objective: To strengthen the capability of Member States in Africa, especially those in arid and semi-arid zones, to assess their water resources.

F/38. Addressee: National water organizations in Africa.

F/39. Main means of achieving objective: Supplying experts and equipment.

F/40. Project planning and duration: The project will be implemented through about 10-15 TC projects, including two regional projects, in African countries in the arid zone or in the Sahel zone. It will deal mainly with the assessment of groundwater resources and recharge. An expert will be permanently assigned to the region to identify areas and problems of major interest, to advise the local staff and to co-ordinate the studies within and between the various countries.

F/41. Output: Enhanced ability to evaluate water resources.

PROBLEM II

F/42. Need to establish the infrastructure for and expertise in the use of nuclear techniques for the development of mineral resources.

ASSESSMENT AND ANALYSIS

F/43. Finding new and more effective techniques for the exploration and exploitation of mineral resources is a problem which concerns the general economy of all countries. Several nuclear techniques are standard tools in prospecting. One example is nuclear borehole logging used systematically with non-nuclear logging. Others such as in situ elemental analysis are being

developed. Tracer techniques are widely applied to improve processes in chemical engineering. In addition, some work has been done which demonstrates the value of these techniques in ore processing. However, further efforts are required to improve techniques and to disseminate information on existing ones among the industries concerned, particularly in developing Member States.

ROLE OF THE AGENCY

F/44. It is the role of the Agency to evaluate the comparative status of nuclear and competing techniques, to assess the state of the art, to help disseminate information and to assist Member States in setting up the infrastructure for the application of nuclear techniques in this area.

Project F.2.05

Dissemination of information on, and assessment of the use of, nuclear techniques in the development of mineral resources

F/45. 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 the development of these techniques.

F/46. Addressee: Research institutions.

F/47. Main means of achieving objective: Meetings, supporting research and development, publishing reports, supplying experts and equipment, training.

F/48. Project planning and duration: Emphasis will be placed on nuclear borehole techniques for the determination of rock characteristics and the evaluation of nuclear techniques compared with traditional methods in soil-water studies. The technical and economic benefits of applications of nuclear techniques in ore processing will be evaluated, as will current trends in nuclear borehole logging techniques for elemental analysis.

F/49. Output: Improved or new techniques for mineral exploration and exploitation, laboratory and research facilities, trained personnel.

Summary of budget estimates by Area of Activity

Table 22

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
F.1. Industrial Applications	339 000	(106 000)	(31.3)	233 000	-	-	233 000	2.6	239 000	5.0	251 000
F.2. Development of Water and Mineral Resources	1 149 000	120 000	10.4	1 269 000	(12 000)	(0.9)	1 257 000	3.5	1 314 000	5.0	1 366 000
Programme F Total	1 488 000	14 000	0.9	1 502 000	(12 000)	(0.8)	1 490 000	3.4	1 553 000	5.0	1 617 000

Summary of main means by Area of Activity

Table 23

Area of Activity	Man-years P	Man-years GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	TC support & advisory services	Total	Responsible Division
	1987/1988 Estimates (Regular Budget)										
F.1. Industrial Applications	4.2	1.6	-	-	150 000	-	-	160 000	180 000	490 000	RIRL
F.2. Development of Water and Mineral Resources	10.2 [8.0]	6.0 [16.0] [2.0]M&O	340 000	20 000	270 000	-	-	740 000	1 310 000	2 680 000	RIRL
Programme F Total	14.4	7.6	340 000	20 000	420 000	-	-	900 000	1 490 000	3 170 000	

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

Programme Area 2: List of projects and estimated resources for 1987/1988

Table 24

		Project	Estimated Resources for 1987/1988			
			Regular Budget	TC resources	Extra-budgetary resources a/	Total
Programme F		INDUSTRY AND EARTH SCIENCES				
Area of Activity						
F.1.		Industrial Applications				
	F.1.01	Establishment of basis for the optimal utilization of radiation and isotope techniques in industry	252 000	-	-	252 000
	F.1.02	Technology transfer of the industrial applications of radiation and isotopes	238 000	691 000	1 480 000	2 409 000
F.1.		Sub - Total	490 000	691 000	1 480 000	2 661 000
F.2.		Development of Water and Mineral Resources				
	F.2.01	Exchange of information on isotopic methods in the assessment of water resources	481 000	-	-	481 000
	F.2.02	Technology transfer in the use of nuclear techniques in the assessment of water resources	857 000	1 141 000	150 000	2 148 000
	F.2.03	Provision of analytical and intercalibration services	779 000	193 000	-	972 000
	F.2.04	Study of water resources in Africa with emphasis on arid and semi-arid zones	249 000	192 000	-	441 000
	F.2.05	Dissemination of information on, and assessment of the use of nuclear techniques in the development of mineral resources	314 000	30 000	-	344 000
F.2.		Sub - Total	2 680 000	1 556 000	150 000	4 386 000
Programme F		Industry and Earth Sciences	3 170 000	2 247 000	1 630 000	7 047 000

a/ Includes funds from other UN organizations.

PROGRAMME G: PHYSICAL AND CHEMICAL SCIENCES

Area of Activity G.1
Nuclear Measurements and Instrumentation

PROBLEM I

G/1. Need to develop and maintain measurement capabilities.

ASSESSMENT AND ANALYSIS

G/2. In many developing Member States, the introduction of nuclear techniques will have a strong impact on the national economy. To maximize this impact, it is important that the most appropriate techniques and methods are selected. The successful application of these depends on the proper use of the relevant instrumentation. In developing Member States, however, the conditions for operating nuclear equipment are not easy: difficult climatic conditions, poor power supply, non-availability of manufacturers' services and general shortage of trained manpower and essential spare components. There is thus a need to build up a system for nuclear instrumentation which is largely self-reliant.

ROLE OF THE AGENCY

G/3. With years of experience in selecting the most suitable equipment for particular conditions and in providing training for engineers and technicians in this field, and having established good contacts with manufacturers and suppliers of nuclear instruments, the Agency is well placed to assist Member States in solving their instrumentation problems. It continously monitors and evaluates the latest developments in nuclear instrumentation and progress in the application of nuclear techniques and advises Member States accordingly.

Project G.1.01

To assist developing Member States to establish capabilities and infrastructures for the proper use and maintenance of nuclear instrumentation

G/4. Objective: To assist developing Member States in establishing and upgrading nuclear science and technology laboratories and in identifying appropriate nuclear analytical techniques and to develop procedures for equipment maintenance.

G/5. Addressee: Nuclear science laboratories and other laboratories applying nuclear techniques.

G/6. Main means of achieving objective: Supplying experts and equipment, training, publishing reports, supporting research and development.

G/7. Project planning and duration: The project will be implemented mainly through TC projects, training courses and CRPs. In the period 1987-88, it is expected that an average of 100-120 such projects will be executed. Emphasis will be placed on the application of microcomputers in nuclear sciences and their integration in nuclear experiments, on the improvement of preventive maintenance practices and on the supply of spare parts. In addition, technical documents and reports on problems in the field of nuclear techniques and instrumentation of particular relevance to developing countries will be published. Work will continue on a support system for instrument maintenance and repair. Training courses on nuclear electronics, the maintenance of nuclear instrumentation and instrumentation aspects of nuclear techniques are planned for 1987-88.

G/8. Output: Functioning, well-equipped nuclear science and technology laboratories and trained personnel to staff them.

PROBLEM II

G/9. Need for accurate and reliable basic numerical data for the development of nuclear energy and its applications.

ASSESSMENT AND ANALYSIS

G/10. Basic nuclear data are numerical constants of nature which quantify the nuclear and atomic behaviour of all elements and isotopes making up the human environment. They are indispensable numbers which scientists and engineers working in nuclear research and industry need in order to solve nuclear problems. Scientists and engineers designing nuclear fission and fusion reactors need large computer files of cross-sections characterizing the interaction of neutrons, charged particles and radiations with matter. Nuclear and non-nuclear scientists employing nuclear methods and techniques need comprehensive up-to-date handbooks and computer files of data on nuclear structure and radioactive decay. The application of, and progress in, nuclear sciences and technologies depend on the universal availability of large amounts of the latest accurate and reliable nuclear data.

ROLE OF THE AGENCY

G/11. In response to the above requirements and in line with its statutory obligation to foster the international exchange of information, the Agency has developed over the last twenty years an effective system for the computer-based compilation, exchange and dissemination of bibliographic and numerical data, covering the interests and needs of both developing and developed countries. As a result, the Agency has built up the expertise to effectively utilize computerized data processing tools in handling numerical information which can particularly satisfy the growing requirements of those developing countries which are in the process of introducing nuclear power and can profitably be used in other Agency programmes and fields of application. These activities are continuously reviewed by the International Nuclear Data Committee (INDC) and the International Fusion Research Council, which are permanent advisory bodies to the Agency.

Project G.1.02

Data assessment and research co-ordination

G/12. 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 or more reliable data for the development of nuclear reactors and applications, and to co-ordinate and support the measurement, calculation and evaluation of the improved data required.

G/13. Addressee: Applied and basic nuclear scientists in nuclear research institutes and industries, national laboratories and atomic energy authorities.

G/14. Main means of achieving objective: Meetings, supporting research and development, publishing reports.

G/15. Project planning and duration: In addition to the continuing aspects of this project, particular emphasis is put on specific data requirements which reflect trends in the growth and development of nuclear technologies. In the past, emphasis has been put on fission product and actinide isotope nuclear data, which are of vital importance to the design, operation and fuel cycle analysis of fission reactors. Currently, standard reference data are given extensive attention and, in the 1987-88 period, increased emphasis will be given to analysing and fulfilling the needs for improved nuclear and atomic data for medical radiotherapy, radiation damage of nuclear materials, nuclear geophysics applications and fusion reactor development.

G/16. Output: Information on the status of existing nuclear and atomic data in specific fields of application and on needs for new or more accurate data.

Project G.1.03

Compilation, evaluation, exchange and validation of data

G/17. 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/18. Addressee: Scientists and engineers in research and industry engaged in the development and application of nuclear techniques, in the analysis of nuclear or atomic measurements and in the development and operation of fission and fusion reactors and their fuel cycles.

G/19. Main means of achieving objective: Maintaining data bases, publishing reports.

G/20. Project planning and duration: 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. The total volume of data expected to be available for distribution to Member States in the 1987-88 period will comprise more than 90 up-to-date libraries (on magnetic tape) containing more than 12 million numerical data records (almost 900 megabytes).

G/21. Output: Authoritative and accurate nuclear and atomic data files and associated data processing computer codes and documentation.

Project G.1.04

Provision of data centre services and technology transfer to developing countries

G/22. 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/23. Addressee: Scientists and engineers in nuclear research and industry, primarily in developing Member States.

G/24. Main means of achieving objective: Providing data centre services, publishing reports, supplying experts and equipment, training.

G/25. Project planning and duration: The Agency has served as a nuclear data centre for over 20 years and will continue to provide such services, mainly to developing countries. Data from developing countries will be collected, evaluated, stored in computerized files and exchanged with the other centres, and requests (some 700 per year) from developing countries for nuclear data for specific applications will be met.

G/26. Technology transfer activities will be implemented mainly through an interreginal TC project in which more than 40 laboratories participate and through 15-20 national TC projects. Two-three training courses on nuclear data technology and applications will be organized.

G/27. Output: Improved access of scientists to data and increased capability of developing Member States to carry out computerized data processing and to use and apply nuclear measurements and techniques.

Area of Activity G.2
Theoretical Physics

PROBLEM I

G/28. 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 those countries to continue and expand their research work.

ASSESSMENT AND ANALYSIS

G/29. The understanding of physical principles is fundamental to, inter alia, the further improvement of existing technologies and the development of new ones. Equally, the interface between physics and other disciplines has come to represent an essential area of research if man is to understand the complex interactions that affect his existence in many ways. The discipline of mathematics, both because of its role in relation to physics and its applicability in relation to other areas, has become a tool of ever-increasing importance. It is essential that individuals trained to work in these fields be aided and encouraged to do so, particularly in the less developed areas of the world where technological progress is limited.

ROLE OF THE AGENCY

G/30. A primary means of promoting the above process is through the activities of an international centre for physics which serves as a focal point for the transfer of science underlying technology and as a stimulus for the interaction of physicists from all Member States engaged in the principal areas of physics. In 1970, the Agency and UNESCO agreed jointly to operate the International Centre for Theoretical Physics in Trieste. The Centre is part of the Agency and is administered jointly by the Agency on behalf of both parties. The Centre serves as a meeting place for physicists from all over the world, currently playing host to some 3000 scientists annually. It also serves as a research centre, holds a substantial number of extended courses, workshops and meetings each year and, to a limited extent, supports similar activities in developing countries. It also runs a programme under which experimentalists from developing countries receive training in Italian industrial and academic laboratories. Since early 1986, it has been providing administrative services against reimbursement for the Third World Academy of Sciences, at the request of that body.

Project G.2.01

International Centre for Theoretical Physics

G/31. Objective: To foster the growth of advanced studies and research in physical and mathematical sciences, 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/32. Addressee: Individual scientists and institutes working in the various areas of physics of relevance to the Centre's programme.

G/33. Main means of achieving objective: The various means employed include the Centre's Associateship Programme, its programme of Federated Institutes, holding courses, seminars and workshops, arranging for visits of scientists from developing countries to established experimental laboratories and sponsoring research at the Centre. A limited number of courses and research activities are also sponsored in developing countries.

G/34. Project planning and duration: In the period 1987-88, the Centre will organize four extended courses and several workshops on physics and high technology with the aim of acquainting the scientists concerned with this rapidly expanding area and of highlighting the relevance of the physicist to the process of industrial development. The Centre's activities in physics and energy will be further developed through four extended courses and three conferences, one of which will be the fifth annual conference held by the Centre in connection with non-conventional sources of energy. Work on fundamental physics will continue to be stressed: a conference, three workshops and continuing research will be conducted on this topic. A total of three courses will be held on applicable mathematics and research activities in this field will be expanded. A number of shorter meetings or other activities will be organized in other areas, including astrophysics, physics of the living state and physics of the environment. 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/35. Output: Advances in the knowledge of physics, increased competence of scientists from developing countries in physics, and contribution to a broadening of the theoretical base for the transfer and further development of technologies in developing countries.

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

PROBLEM I

G/36. Need for collection, analysis and dissemination of information and the provision of practical guidance on the use of research reactors and particle accelerators

ASSESSMENT AND ANALYSIS

G/37. There are more than 300 research reactors operating in Member States and most are not fully utilized. In view of the high capital investment and operating costs of a research reactor, this situation is far from satisfactory.

G/38. The availability of highly enriched uranium (HEU) for research reactor fuel has been greatly reduced recently and HEU will become more difficult to obtain in the future. Reactor operators thus need assistance in acquiring the information and techniques required to convert reactors. In addition, many reactors are operating with fuel of a design which is 10-20 years old. As the cost of such fuel increases, the need for the reactor operator to redesign his core to minimize fuel cycle costs will become greater. The ability to perform the calculations required to do this, which are identical to core conversion calculations, is lacking in most developing Member States.

ROLE OF THE AGENCY

G/39. The Agency can help Member States to use their research reactors more fully by collecting and disseminating information on, and providing training in, various aspects of the use of such reactors and their conversion from HEU to LEU fuel.

Project G.3.01

To collect, analyse and disseminate information on the use of low-enriched uranium instead of high-enriched uranium

G/40. Objective: To assist research reactor owners in Member States to establish programmes for, and to convert their reactors to, the use of LEU fuels.

G/41. Addressee: Research reactor owners and operators in more than 50 Member States.

G/42. Main means of achieving objective: Publishing reports, training.

G/43. Project planning and duration: To date, reports dealing with the technical feasibility of converting light-water moderated and heavy-water moderated research reactors to LEU and with the preoperational and startup procedure for core conversion have been published. Further reports on safety and licensing issues relating to core conversion and on the properties and irradiation behaviour of LEU fuels are currently being prepared. In 1987 and 1988, it is planned to produce reports on the application of core conversion for specific reactor types. Planning for the conversion of individual reactors will continue to be carried out in conjunction with national authorities.

G/44. Output: Increased ability of research reactor owners to convert reactors.

Project G.3.02

To provide practical guidance to developing Member States on the optimal utilization of research reactors and particle accelerators

G/45. Objective: To increase the utilization of research reactors and particle accelerators in Member States and to assist new and potential reactor and particle accelerator owners and operators to develop research programmes.

G/46. Addressee: Research reactor owners and operators as well as potential owners and operators.

G/47. Main means of achieving objective: Meetings, training, supplying experts and equipment, supporting research and development, maintaining a data base.

G/48. Project planning and duration: The project will be implemented principally through TC projects of which 30-40 will be executed. Emphasis will be given to activities which serve the educational, governmental, private and industrial sectors. In addition, a training course is foreseen for 1987 and a symposium on multi-purpose research reactors and related international co-operation will be held in 1987. 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 was published in 1988. A technical document (first issued in 1986) listing the nuclear research reactors in the world will be produced periodically.

G/49. Output: Increased and more effective utilization of research reactors and particle accelerators in Member States.

Area of Activity G.4
Chemistry

PROBLEM I

G/50. Need to establish the infrastructure for, and to improve standards in, analytical chemistry, radiochemical applications and chemistry relating to the development of atomic energy.

ASSESSMENT AND ANALYSIS

G/51. It is a basic and continuing objective of analytical laboratories in Member States to develop reliable and accurate analytical capabilities. Radiochemical and separation techniques for application in the study of raw materials, geology, biosciences, health, the environment, nuclear materials and safeguards and for the preparation of labelled molecules are used beneficially in industrial applications or as radiopharmaceuticals, but need to be improved to keep abreast of the latest developments in these fields.

For the development of nuclear energy, including that of new technologies in fusion, a continuing effort to improve the associated chemical techniques is essential.

ROLE OF THE AGENCY

G/52. It is the Agency's role to operate an analytical quality control service for the purpose of organizing analytical intercomparisons and providing certified or uncertified reference materials. The aim is to improve the reliability of the analytical work of laboratories in Member States in areas relating to nuclear energy and radioisotope application.

G/53. Also, the Agency can assess the state of the art, help disseminate information and assist developing Member States to create their own facilities for the production of isotopes, labelled molecules and radiopharmaceuticals and for analytical purposes.

Project G.4.01

Provision of direct assistance in establishing capabilities for the production and quality control of radiopharmaceuticals and labelled compounds and in the application of nuclear chemical techniques and chemistry in nuclear energy

G/54. Objective: To assist laboratories in developing Member States to improve their ability to provide chemical analytical services, to develop infrastructures for the preparation of radiopharmaceuticals and to improve standards in analytical chemistry, in radiochemical applications and in chemistry relating to atomic energy.

G/55. Addressee: Organizations and national authorities involved in nuclear analytical techniques and in the development of radiopharmaceutical utilization.

G/56. Main means of achieving objective: Meetings, publishing reports, supplying experts and equipment, training, supporting research and development.

G/57. Project planning and duration: Developing Member States are continuously requesting assistance in the use of nuclear analytical techniques and the preparation of radiopharmaceuticals. It is expected that in the period 1987-88 about 50-60 TC projects will be executed and 2-3 interregional training courses organized. The project will deal with the production of fission molybdenum for medical use and with nuclear analytical techniques for on-line analysis in industry, and a technical report will be published on target technology for cyclotron production in 1988. Volumes 12 and 14 of the data compilation "Chemical Thermodynamics of Actinide Elements and Compounds" will be prepared. In the area of chemistry of fusion materials, a technical report will be published on breeding materials for fusion reactors.

G/58. Output: Improved capability of laboratories in developing countries to provide nuclear analytical services, to produce radiopharmaceuticals and labelled compounds and to apply nuclear chemical techniques in nuclear energy.

Project G.4.02

Provision of intercomparison and quality control services to check the validity of analytical performance

G/59. Objective: To provide assistance to Member States in checking the performance of their analytical methods.

G/60. Addressee: Organizations involved in the application of nuclear analytical techniques.

G/61. Main means of achieving objective: Analytical laboratory services.

G/62. Project planning and duration: In 1987-88, three analytical quality control intercomparisons for the determination of minor and trace elements as well as radioactivity (natural/artificial) in different materials of environmental interest (coal, fly ash and conifer needles, for example) involving 50-150 institutes will be conducted each year.

G/63. Each year about 1500-2000 different samples of reference materials and certified reference materials will be distributed from the stock of some 50 different items covering the areas of nuclear materials and stable isotopes ($^{18}O/^{16}O$, $^{2}H/^{1}H$, water) and biological and environmental materials (terrestrial/marine).

G/64. Output: Better and more reliable nuclear analytical capabilities in Member States' laboratories.

Summary of budget estimates by Area of Activity

Table 25

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
G.1. Nuclear Measurements and Instrumentation	2 399 000	10 000	0.4	2 409 000	35 000	1.5	2 444 000	3.4	2 491 000	4.9	2 651 000
G.2. Theoretical Physics	1 170 000	-	-	1 170 000	-	-	1 170 000	3.2	1 207 000	3.4	1 248 000
G.3. Utilization of Research Reactors and Particle Accelerators	581 000	15 000	2.6	596 000	5 000	0.8	601 000	3.5	617 000	4.3	649 000
G.4. Chemistry	764 000	20 000	2.6	784 000	3 000	0.4	787 000	4.0	815 000	4.5	855 000
Programme G Total	4 914 000	45 000	0.9	4 959 000	43 000	0.9	5 002 000	3.4	5 130 000	4.5	5 403 000

Summary of main means by Area of Activity

Table 26

Area of Activity	Man-years P	Man-years GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	TC support & advisory services	Total	Responsible Division
	1987/1988 Estimates (Regular Budget)										
G.1. Nuclear Measurements and Instrumentation	29.4 [5.0]	24.6 [20.2] [4.8]M&O	291 000	1 600 000	1 000 000	-	-	1 011 000	1 240 000	5 142 000	RIRL
G.2. Theoretical Physics	22.0	50.0	800 000	-	215 000	-	-	300 000	1 140 000	2 455 000	RITP
G.3. Utilization of Research Reactors and Particle Accelerators	2.2	1.4	270 000	-	330 000	-	-	466 000	200 000	1 266 000	RIRL
G.4. Chemistry	4.2 [4.4]	1.0 [7.0] [2.2]M&O	-	-	450 000	-	-	500 000	720 000	1 670 000	RIRL
Programme G Total	57.8	77.0	1 361 000	1 600 000	1 995 000	-	-	2 277 000	3 300 000	10 533 000	

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

Programme Area 2: List of projects and estimated resources for 1987/1988

Table 27

		Project	Estimated Resources for 1987/1988 Regular Budget	TC resources	Extra-budgetary resources a/	Total
Programme G Area of Activity		PHYSICAL AND CHEMICAL SCIENCES				
G.1.		Nuclear Measurements and Instrumentation				
	G.1.01	To assist developing Member States to establish capabilities and infrastructures for the proper use and maintenance of nuclear instrumentation	1 906 000	7 978 000	-	9 884 000
	G.1.02	Data assessment and research co-ordination	675 000	-	-	675 000
	G.1.03	Compilation, evaluation, exchange and validation of data	1 678 000	-	-	1 678 000
	G.1.04	Provision of data centre services and technology transfer to developing countries	883 000	692 000	-	1 575 000
G.1.		Sub - Total	5 142 000	8 670 000	-	13 812 000
G.2.		Theoretical Physics				
	G.2.01	International Centre for Theoretical Physics	2 455 000	-	23 916 000	26 371 000
G.2.		Sub - Total	2 455 000	-	23 916 000	26 371 000
G.3.		Utilization of Research Reactors and Particle Accelerators				
	G.3.01	To collect, analyse and disseminate information on the use of low-enriched uranium instead of high-enriched uranium	267 000	240 000	208 000	715 000
	G.3.02	To provide practical guidance to developing Member States on the optimal utilization of research reactors and particle accelerators	999 000	7 352 000	-	8 351 000
G.3.		Sub - Total	1 266 000	7 592 000	208 000	9 066 000
G.4.		Chemistry				
	G.4.01	Provision of direct assistance in establishing capabilities for the production and quality control of radiopharmaceuticals and labelled compounds and in the application of nuclear chemical techniques and chemistry in nuclear energy	1 193 000	302 000	-	1 495 000
	G.4.02	Provision of intercomparison and quality control services to check the validity of analytical performances.	477 000	-	-	477 000
G.4.		Sub - Total	1 670 000	302 000	-	1 972 000
Programme G		Physical and Chemical Sciences	10 533 000	16 564 000	24 124 000	51 221 000
Total Programme Area 2		Nuclear Applications	31 832 000	62 455 000	31 261 000	125 548 000

a/ Includes funds from other UN organizations.

PROGRAMME AREA 3

NUCLEAR SAFETY AND RADIATION PROTECTION

Summary of resources by programme

Table 28

Programme	Man-years a/		Planned expenditure for the implementation of the programme in 1987/1988				
	P	GS	Regular Budget estimates	Funds from other UN organizations	TC resources	Other extra-budgetary resources	Total
H. Radiation Protection	20.8	13.4	4 509 000	-	7 445 000	87 000	12 041 000
SNSP (Net)	a/	a/	1 237 000	-	-	-	1 237 000
I. Safety of Nuclear Installations	35.0	24.0	5 600 000	-	6 611 000	111 000	12 322 000
SNSP (Net)	a/	a/	2 234 000	-	-	-	2 234 000
Programme Area 3	55.8	37.4	13 580 000	-	14 056 000	198 000	27 834 000

a/ Does not include possible additional manpower for the SNSP.

PROGRAMME H: RADIATION PROTECTION

Area of Activity H.1
Occupational Radiation Protection and Health Effects

PROBLEM I

H/1. Member States need to provide adequate radiation protection for workers in science, industry and medicine engaged in activities involving potential radiation exposure.

ASSESSMENT AND ANALYSIS

H/2. Millions of workers in virtually all Member States are occupationally exposed to ionizing radiation. Internationally recognized guidelines are needed to serve as a uniform basis for the preparation and updating of consistent national radiation protection regulations and procedures, to ensure adequate worker protection. Fundamental recommendations on radiation protection are provided and periodically revised by the International Commission on Radiological Protection (ICRP). Significant work is required to convert these recommendations into standards and guidelines which can be applied in practice. Following a major revision of the ICRP's recommendations in 1977, the Agency issued (jointly with ILO, WHO and OECD/NEA) revised Basic Safety Standards for Radiation Protection (BSS) in 1982. Subsequently a programme was initiated to complement these general standards with more detailed guides, recommendations and procedures and data applicable to specific situations and to assist Member States in incorporating these guidelines into national legislation and practice.

ROLE OF THE AGENCY

H/3. In view of the Agency's statutory obligation to establish standards of safety for radiation protection and of international recognition of its experience and past work in this field, it is appropriate for the Agency to formulate internationally agreed guidelines and to assist Member States in establishing and implementing national radiation protection systems.

Project H.1.01

Development of occupational radiation protection guidelines

H/4. Objective: To elaborate and provide to Member States a comprehensive set of internationally recognized standards, guides, recommendations and procedures and data relating to the design of radiation protection systems for nuclear installations, to operational radiation protection and to radiation exposure monitoring.

H/5. Addressee: Regulatory bodies and other competent authorities, ministries of labour, designers and operators of nuclear installations, occupational health physicists.

H/6. Main means of achieving objective: Meetings, publishing guidelines, supporting research and development.

H/7. Project planning and duration: The current phase of the project was initiated with the publication of the revised BSS in 1982. By the end of 1985, four publications containing guidelines will have been prepared. This project phase will be largely completed by 1988, with a total number of about 20 publications. During the period 1987-88, work will concentrate mainly on the areas of operational radiation protection and occupational monitoring and, after this period, on the preparation of practical guidance in this area.

H/8. Output: Authoritative basis for the establishment of national occupational radiation protection regulations and guidelines consistent with internationally agreed requirements.

Project H.1.02

Implementation of occupational radiation protection guidelines

H/9. Objective: To improve the radiation protection of workers in Member States by providing direct assistance to national authorities in raising the level of understanding of radiation protection principles and in applying the Agency's radiation protection standards and criteria.

H/10. Addressee: Regulatory bodies and other competent authorities, ministries of labour, designers and operators of nuclear installations, occupational health physicists.

H/11. Main means of achieving objective: Supplying experts and equipment, training, meetings, publishing guidelines, maintaining a data base.

H/12. Project planning and duration: During the period 1987-88, it is intended to provide training on general and specific aspects of radiation protection and assistance aimed at individual countries (10-12 radiation protection advisory team (RAPAT) missions; participation in 8-10 operational safety review team (OSART) missions; eight advisory missions on specific radiation protection topics; 40-60 TC projects). These activities will be directed principally towards countries in the early stages of nuclear development. A seminar on the application of computer technology to radiation protection will be held in 1987.

H/13. A conference on radiation protection in nuclear energy (covering all aspects of radiation protection) will be organized in 1988.

H/14. Output: Increased ability to set up and implement occupational radiation protection regulations and practices and to handle radiation sources and radioactive material safely.

PROBLEM II

H/15. Member States need guidance on adequate measures to minimize - through proper handling - the consequences of radiation over-exposures.

ASSESSMENT AND ANALYSIS

H/16. Severe over-exposures needing intensive medical treatment are infrequent events in the operation of nuclear facilities. However, there have been over-exposures involving members of the public as a result of the use of various nuclear techniques. The consequences are potential health damage (stochastic and non-stochastic effects) and occasional deaths. Adequate guidelines and procedures are needed in all Member States to cover the three phases of the medical handling of unacceptable exposures: dose assessment, clinical evaluation, and treatment. These guidelines, recommendations and procedures must be formulated, disseminated and constantly brought up to date in close co-operation with other international organizations such as WHO, ILO and CMEA. The production and dissemination of specific information to improve the level of understanding of the problem and to provide guidance on how to handle such cases of exposure, especially in developing countries, will help reduce the number of accidents and minimize their consequences.

ROLE OF THE AGENCY

H/17. As an international organization specializing in ionizing radiations, the Agency is well placed to play a role in the production of criteria and guidelines for the medical handling of persons subjected to unacceptable exposures, for the early medical treatment of radiation injuries and for the development of new biological dosimetric methods.

Project H.1.03

Development and implementation of medical guidelines for the handling of persons subjected to unacceptable exposures

H/18. Objective: To prepare and provide to Member States internationally recognized medical standards, guides and recommendations for application in radiation protection, and to develop biological methods of dose assessment in workers and members of the public affected by accidental over-exposures.

H/19. Addressee: National health authorities and regulatory bodies, medical general practitioners, health physicists.

H/20. Main means of achieving objective: Meetings, publishing guidelines, supporting research and development.

H/21. Project planning and duration: The project was initiated in 1984 and will be completed in 1988. By that time, seven technical documents will have been published on such topics as the diagnosis, prognosis and treatment of internal and external over-exposures.

H/22. Output: Increased ability in the medical handling of persons subjected to unacceptable exposures.

Area of Activity H.2
Radiation Protection of the General Public

PROBLEM I

H/23. Member States need to provide adequate radiation protection for members of the general public from activities involving potential radiation exposure.

ASSESSMENT AND ANALYSIS

H/24. A small but growing fraction of the radiation exposure of members of the public is caused by activities involving the use of nuclear energy, including environmental releases of radioactive material from the nuclear industry. International standards and criteria for the radiation protection of members of the public need to be established to ensure consistent control of such public exposures, the aim being that these should serve as a basis for all Member States and eventually be incorporated in their national regulations.

ROLE OF THE AGENCY

H/25. The ICRP provides basic recommendations for the radiation protection of the public. The Agency's statutory obligation (Article III.A.6) is to formulate standards derived from these recommendations for the protection of public health, to apply these standards to its own activities and to provide for their implementation in Member States. The universality of the Agency may facilitate the formulation of internationally consistent national policies on radiation and public health and ensure the safe development of nuclear energy.

Project H.2.01

Development of guidelines for the radiation protection of the general public

H/26. Objective: To elaborate and provide to Member States a comprehensive set of internationally recognized standards, guides and recommendations on the limitation of releases of radioactive effluents into the environment, on radiation protection principles for potential exposures, on annual limits of intake for the general public, on the establishment of 'upper bounds' and on radiation protection monitoring of the public.

H/27. Addressee: Regulatory bodies and other competent authorities, ministries of energy and the environment, operators of nuclear installations, radiation protection officers.

H/28. Main means of achieving objective: Meetings, publishing guidelines.

H/29. Project planning and duration: The current phase of the project was initiated following the publication of the revised BSS in 1982. Three publications will be finalized in 1985 and a further seven will be completed by 1988. The main areas of concentration will be limiting releases of radioactive effluents from nuclear facilities, methodologies for environmental assessments, environmental monitoring and the application of the principles of radiation protection to sources of potential exposure.

H/30. Output: Authoritative basis for the establishment of national policies and regulations for the radiation protection of the general public and environmental protection, and establishment of guidelines consistent with internationally agreed requirements.

Project H.2.02

Implementation of guidelines for the radiation protection of the general public

H/31. Objective: To improve the radiation protection of members of the general public in Member States by providing direct assistance to national authorities in raising the level of understanding of radiation protection principles and in applying the Agency's radiation protection standards and criteria.

H/32. Addressee: Regulatory bodies and other competent authorities, ministries of energy and the environment, operators of nuclear installations, radiation protection officers.

H/33. Main means of achieving objective: Supplying experts and equipment, training, publishing guidelines, supporting research and development, maintaining a data base.

H/34. Project planning and duration: During the period 1987-88, it is intended to provide both general assistance through a training course and assistance aimed at individual countries through some 15 advisory missions and 40-60 TC projects.

H/35. Developments in the phenomenology and practical aspects of peaceful nuclear explosions will be monitored and, if appropriate, an expert group will be convened on this subject.

H/36. Output: Higher level of technical competence in developing Member States regarding the implementation of regulations and programmes for the radiation protection of the general public and the protection of the environment.

Area of Activity H.3
Safe Transport of Radioactive Materials

PROBLEM I

H/37. Member States need to ensure that radioactive materials are transported safely.

ASSESSMENT AND ANALYSIS

H/38. Recent data collected by the Agency shows that more than 30 million packages of radioactive materials are shipped each year, many across national boundaries. In order that national requirements are satisfied and that radiation and nuclear criticality safety are ensured during transport, the formulation, maintenance and upgrading of regulations controlling these shipments and of guidelines on their application, the compilation of data supporting these activities and the preparation of training materials must be accomplished in a co-ordinated and comprehensive manner.

ROLE OF THE AGENCY

H/39. Since its inception, the Agency has played a central role in this area. The Regulations for the Safe Transport of Radioactive Material (Safety Series No. 6) and the supporting documents published by the Agency have served as the basis for similar regulatory control documents in Member States and international transport organizations such as ICAO and IMO. A coherent, long-term programme to update and encourage the use of these documents is necessary because their adoption and implementation by these States and organizations is inherently a long-term process.

Project H.3.01

Maintenance and revision of the transport regulations and supporting documents

H/40. Objective: To maintain, review and revise the Regulations for the Safe Transport of Radioactive Material to ensure their consistency with technological developments and the changing needs and requirements of Member States and relevant international organizations.

H/41. Addressee: National authorities responsible for regulating the transport of hazardous goods, international transport organizations, designers, consignors, consignees and carriers of radioactive material.

H/42. Main means of achieving objective: Meetings, publishing reports, supporting research and development.

H/43. Project planning and duration: The current phase of the project was initiated in 1984 with the approval by the Board of Governors of the 1985 edition of the above Regulations. By mid-1986, three safety series documents and three technical reports (which will serve as the foundation for future work leading to other safety series documents) providing advice on the

application of the Regulations will have been issued. The remaining supporting documents to be prepared during this phase will be completed by 1988. The main areas dealt with will be the optimization of radiation protection, nuclear criticality safety, emergency planning for transport accidents, quality assurance and package design and testing.

H/44. Output: Enhanced safety and uniformity of the packages and procedures used for the transport of radioactive material.

Project H.3.02

Implementation of the transport regulations

H/45. Objective: To compile and disseminate information on competent authorities, international approval certificates, package test facilities and shipping volumes and to assist Member States in the proper implementation of the transport regulations.

H/46. Addressee: National authorities responsible for regulating the transport of hazardous goods, international transport organizations, designers, consignors, consignees and carriers of radioactive material.

H/47. Main means of achieving objective: Supplying experts, training, publishing documents, maintaining data bases.

H/48. Project planning and duration: Data on competent authorities' certificates and procedures will continue to be published twice a year. Specific guidelines for international organizations (ICAO, IMO and ADR/RID) on the Regulations will be completed by 1987. Detailed training of staff in competent authorities in developing countries will continue. A seminar on the adoption, application and implementation of the regulations will be held in 1987.

H/49. Output: Increased uniformity of international regulatory documents and procedures and increased ability of Member States' competent authorities to understand and adequately apply transport regulations.

Area of Activity H.4
Emergency Planning and Preparedness

PROBLEM I

H/50. Member States need to establish viable emergency plans and emergency preparedness infrastructures capable of responding effectively to a serious nuclear accident or radiological emergency.

ASSESSMENT AND ANALYSIS

H/51. More than 500 nuclear power plants and many other types of nuclear installation are in operation, under construction or planned. Although the growth in the use of nuclear energy and radioactive materials has been accompanied by a corresponding awareness of the need for strict safety requirements and regulations, the possibility of failures which lead to a serious accident cannot be entirely eliminated. There is thus a need to determine in advance the appropriate emergency responses necessary to prevent or mitigate the consequences of an accident, to draw up and implement formal emergency plans and to establish emergency preparedness infrastructures.

ROLE OF THE AGENCY

H/52. In accordance with its statutory obligations, the Agency can play an important role in the development and establishment of emergency planning and preparedness infrastructures and in the preparation of relevant guidelines.

Project H.4.01

Development of guidelines for emergency planning and preparedness

H/53. Objective: To formulate and provide to Member States a comprehensive set of internationally recognized technical guides on emergency planning and preparedness for nuclear facilities.

H/54. Addressee: Regulatory bodies and other national competent authorities and operators of nuclear facilities.

H/55. Main means of achieving objectives: Meetings, publishing guidelines.

H/56. Project planning and duration: A total of 12 technical guidance documents will have been published by the end of 1985. The remaining documents will be completed in 1988.

H/57. Output: A comprehensive set of internationally recognized technical guidance publications which can serve as a basis for the development of adequate emergency plans and emergency preparedness infrastructures for nuclear facilities in Member States.

Project H.4.02

Implementation of guidelines for emergency planning and preparedness

H/58. Objective: To provide direct assistance to Member States in emergency planning and preparedness.

H/59. Addressee: Regulatory bodies and other national competent authorities and operators of nuclear facilities.

H/60. Main means of achieving objective: Training, supplying experts.

H/61. Project planning and duration: Training will continue to be offered in 1987 and 1988 through formal training courses and fellowships. Special national training courses will be held in about six developing Member States. Some eight missions are also foreseen.

H/62. Output: Improved capability to respond effectively to a nuclear accident or radiological emergency.

Summary of budget estimates by Area of Activity

Table 29

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
H.1. Occupational Radiation Protection and Health Effects	949 000	(116 000)	(12.2)	833 000	26 000	3.1	859 000	3.2	860 000	5.0	931 000
H.2. Radiation Protection of the General Public	587 000	(120 000)	(20.4)	467 000	110 000	23.6	577 000	3.4	483 000	4.4	623 000
H.3. Safe Transport of Radioactive Materials	299 000	114 000	38.1	413 000	(50 000)	(12.1)	363 000	3.4	427 000	4.4	392 000
H.4. Emergency Planning and Preparedness	299 000	91 000	30.4	390 000	(29 000)	(7.4)	361 000	3.1	402 000	5.1	391 000
SNSP (Net)	-	622 000	-	622 000	(77 000)	(12.4)	545 000	3.5	645 000	4.8	592 000
Programme H Total	2 134 000	591 000	27.7	2 725 000	(20 000)	(0.7)	2 705 000	3.4	2 817 000	4.7	2 929 000

Summary of main means by Area of Activity

Table 30

1987/1988 Estimates (Regular Budget)

Area of Activity	Man-years a/ P	Man-years a/ GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	SNSP (Net) b/	TC support & advisory services	Total	Responsible Division
H.1. Occupational Radiation Protection and Health Effects	9.0	4.8	300 000	-	920 000	-	-	261 000	-	310 000	1 791 000	NENS
H.2. Radiation Protection of the General Public	4.8	3.2	96 000	-	680 000	-	-	200 000	-	130 000	1 106 000	NENS
H.3. Safe Transport of Radioactive Materials	2.6	3.2	89 000	-	590 000	-	-	110 000	-	30 000	819 000	NENS
H.4. Emergency Planning and Preparedness	4.4	2.2	-	-	710 000	-	-	-	-	83 000	793 000	NENS
Supplementary Nuclear Safety Programme (SNSP) (Net)	a/	a/	-	-	-	-	-	-	1 237 000	-	1 237 000	NENS
Programme H Total	20.8	13.4	485 000	-	2 900 000	-	-	571 000	1 237 000	553 000	5 746 000	

a/ Does not include possible additional manpower for the SNSP.

b/ The "main means" of implementing the SNSP have not yet been decided.

H. RADIATION PROTECTION

Programme Area 3: List of projects and estimated resources for 1987/1988

Table 31

		Project	Estimated Resources for 1987/1988			
			Regular Budget	TC resources	Extra-budgetary resources a/	Total
Programme H		RADIATION PROTECTION				
Area of Activity						
H.1.		Occupational Radiation Protection and Health Effects				
	H.1.01	Development of occupational radiation protection guidelines	776 000	-	23 000	799 000
	H.1.02	Implementation of occupational radiation protection guidelines	502 000	4 102 000	22 000	4 626 000
	H.1.03	Development and implementation of medical guidelines for the handling of persons subjected to unacceptable exposures	513 000	418 000	-	931 000
H.1.		Sub - Total	1 791 000	4 520 000	45 000	6 356 000
H.2.		Radiation Protection of the General Public				
	H.2.01	Development of guidelines for the radiation protection of the general public	725 000	-	21 000	746 000
	H.2.02	Implementation of guidelines for the radiation protection of the general public	381 000	2 090 000	21 000	2 492 000
H.2.		Sub - Total	1 106 000	2 090 000	42 000	3 238 000
H.3.		Safe Transport of Radioactive Materials				
	H.3.01	Maintenance and revision of the transport regulations and supporting documents	410 000	-	-	410 000
	H.3.02	Implementation of the transport regulations	409 000	418 000	-	827 000
H.3.		Sub - Total	819 000	418 000	-	1 237 000
H.4.		Emergency Planning and Preparedness				
	H.4.01	Development of guidelines for emergency planning and preparedness	434 000	-	-	434 000
	H.4.02	Implementation of guidelines for emergency planning and preparedness	359 000	417 000	-	776 000
H.4.		Sub - Total	793 000	417 000	-	1 210 000
		SNSP (Net)	1 237 000	-	-	1 237 000
Programme H		Radiation Protection	5 746 000	7 445 000	87 000	13 278 000

a/ Includes funds from other UN organizations.

PROGRAMME I: SAFETY OF NUCLEAR INSTALLATIONS

Area of Activity I.1
Safety Principles and Regulatory Organization

PROBLEM I

I/1. Need to identify common basic approaches to nuclear safety.

ASSESSMENT AND ANALYSIS

I/2. Approaches to nuclear safety have been developed during the past few decades in each of the countries undertaking large nuclear programmes and differences now exist in the safety regulations of these countries. This situation has arisen because of the characteristics of each reactor type, the nature of the nuclear organization in each country and the nature of the legislative processes involved. These differences in safety approaches and regulations continue to persist and are even being accentuated as the world nuclear power industry moves from a predominantly design and construction phase to an operational phase.

I/3. While the individual resolution of such issues has achieved satisfactory safety results in the developed countries, this type of approach creates difficulties for countries embarking on nuclear power programmes. The problem is particularly severe in cases where a new nuclear programme comprises different reactor types and/or comprises the same reactor type originating from different countries.

I/4. Accordingly, there is a need to identify the common basic approaches which underlie the numerous requirements prescribed by different countries for various types of reactor and to gradually develop commonly shared safety objectives and approaches. The results of this work will be of great interest to developing countries and will guide the Agency in its assistance programmes to these countries. In addition, the work will lessen the divergence between the national safety requirements of the developed countries, make more clear the high level of safety achieved in the nuclear field and might also positively influence public opinion on the subject.

ROLE OF THE AGENCY

I/5. In view of its statutory obligations, it is appropriate for the Agency to arrange for an international exchange of information on safety issues, to identify solutions and to formulate commonly shared safety principles and objectives.

Project I.1.01

Development of safety principles

I/6. 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.

I/7. Addressee: International organizations, regulatory bodies, utilities, designers and constructors of nuclear installations.

I/8. Main means of achieving objective: Meetings, publishing reports.

I/9. Project planning and duration: The project was formally initiated in 1985 with the first meeting of the International Nuclear Safety Advisory Group (INSAG). The Group was initially convened for a term of three years, at the end of which (late 1987) the project will be reviewed. Five topics (source term, feedback of operational safety experience, human element, quality assurance and safety goals) were selected during the first meeting for inclusion in the work of INSAG for the period 1985-1987.

I/10. The project also includes annual reporting on relevant international activities and the current status of nuclear safety and radiation protection in the form of the Nuclear Safety Review.

I/11. Output: Authoritative advice on the establishment of commonly shared safety principles and objectives and on solutions to some current safety issues.

PROBLEM II

I/12. Regulatory bodies need to establish the capability to perform effective safety reviews.

ASSESSMENT AND ANALYSIS

I/13. In addition to those countries which are currently embarking on a nuclear power programme, an estimated 20 countries which have no such programme yet could initiate one in the short or medium term. A priority task in such countries is the establishment and proper staffing of a regulatory body. The code of practice and safety guides on governmental organization prepared between 1974 and 1985 under the nuclear safety standards (NUSS) programme contain sufficient detail on the organization and responsibilities of a regulatory body and are being increasingly used by Member States. There is a need to assist Member States starting a nuclear programme in the use of these documents and in their tasks of safety review, assessment and inspection during nuclear power plant construction and operation.

I/14. Furthermore, Member States with an established but limited nuclear power programme require assistance in reviewing their regulatory body's organization and working methods.

ROLE OF THE AGENCY

I/15. With its accumulated expertise, the Agency can assist Member States in organizing their regulatory body and in training staff and can draw up

supplementary documents to the NUSS code and guides on governmental organization.

Project I.1.02

Development and implementation of guidelines for regulating safety

I/16. Objective: To prepare guidelines to supplement the NUSS code and guides on regulatory organizations, predominantly for use by Member States embarking on a nuclear programme and to provide direct assistance to Member States in setting up effective regulatory bodies.

I/17. Addressee: Regulatory bodies, utilities, designers and constructors of nuclear facilities.

I/18. Main means of achieving objective: Meetings, publishing guidelines, training, supplying experts.

I/19. Project planning and duration: During 1987-88, the main emphasis will be on the preparation of supplementary documents in the form of manuals to assist Member States in adapting the NUSS code and safety guides on governmental organization. Information to be collected from users will be used to revise documents and to draw up regulations for other types of nuclear installation at a later date.

I/20. Furthermore, it is intended to provide general assistance in the form of regional and national training courses and workshops as well as specific assistance to individual countries (two advisory missions and some 30-40 TC projects). These activities will be directed primarily towards countries in the early stages of nuclear development.

I/21. Output: Increased capability of regulatory bodies to perform their tasks through implementation of internationally agreed guidelines.

Area of Activity I.2
Safety Research and Analysis

PROBLEM I

I/22. Member States need a forum for the exchange of information on safety research programmes so as to speed up the worldwide dissemination of scientific information and to assist them in their safety assessments.

ASSESSMENT AND ANALYSIS

I/23. The exchange of information on worldwide safety research is an important means of improving the effective allocation of the resources for this activity within each Member State.

I/24. Research results on the phenomenology of nuclear accidents, the experimental bases of analytical tools, and the background to the resolution of particular design and operational safety issues are not always shared world wide at present. Furthermore, in many cases the essential experimental results are obtained from very costly and unique experiments (large facilities, innovative and specialized diagnostic and measurement techniques and so on). The dissemination of research results is necessary not only to permit the efficient use of resources in countries with large nuclear programmes but also to allow the safety experts of countries with small nuclear programmes and limited research capacity to base their decisions on real needs.

ROLE OF THE AGENCY

I/25. As an international organization, the Agency can provide a forum for the exchange of information on nuclear safety research and disseminate information on the work planned and performed. Safety research covers a broad spectrum of issues. The Agency will concentrate on providing the technical basis for safety assessment and safe operation that is needed by Member States with limited resources.

Project I.2.01

Exchange of information on safety issues and research

I/26. Objective: To provide a forum for the exchange of information on nuclear safety research, including identified design and operational safety issues, and to disseminate information on the work planned and performed.

I/27. Addressee: Governmental agencies performing research in the nuclear field, regulatory bodies, utilities, designers and constructors of nuclear facilities.

I/28. Main means of achieving objective: Meetings, publishing documents.

I/29. Project planning and duration: During the period 1987-88, guidance will be provided on a number of current safety issues (e.g. criteria for design bases and back fitting issues) by holding an advisory group meeting each year. In addition, a technical committee meeting on reactor safety research will be held annually to exchange infomation on safety research and to select research topics considered to be of priority by Member States. These topics will be discussed in detail in meetings of experts which will also be convened annually. Two symposia will be organized in 1987, one on safety aspects of the ageing and maintenance of nuclear power plants and the other on the implications of severe accidents for the design and licensing of nuclear power plants.

I/30. The first edition of Nuclear Safety Research Abstracts covering blowdown and emergency core cooling was published in 1985. It is planned to expand this publication in 1987 to cover additional topics of interest to Member States such as degraded core accident prevention and management and early diagnosis of failure. Some effort will be devoted to the exchange of scientists between research institutions.

I/31. Output: Improved dissemination of safety research results.

PROBLEM II

I/32. Member States need to assess the safety of nuclear installatons, including research reactors, in order to understand and prevent accidents and to evaluate their potential consequences.

ASSESSMENT AND ANALYSIS

I/33. Accident prevention and consequence analysis provide the basis for assessing the adequacy of the safety level of a nuclear installation. These analyses are based on sophisticated computer techniques which require a thorough knowledge of plant systems, their failure mode, the physical phenomena which occur during accidents and their computational models.

I/34. It has been recognized that the main contribution to risk may come from severe accident sequences which lead to core damage. Important progress has been made in the modelling of these accidents for specific plants and in the assessment of related radioactive releases (source term). These techniques can lead to better management of severe accidents and more realistic emergency planning based on the knowledge of the actual type, amount and chemical form of the radionuclides which could be released.

I/35. These techniques are not easily available to countries with limited resources or those in the early stages of a nuclear power programme.

ROLE OF THE AGENCY

I/36. The Agency can make available to experts from developing countries computer techniques which will assist them in developing an understanding of accident phenomena, accident prevention and consequence analysis. It can also assist with the gradual introduction of severe accident analysis methodology and source term reassessment in order to prepare regulatory body staff and operators for severe accident prevention management and emergency planning.

Project I.2.02

Assistance with safety assessment

I/37. Objective: To provide assistance and training, including computation facilities, on the safety analysis of incidents in nuclear installations and the control of the consequences of such incidents.

I/38. Addressee: Regulatory bodies and utilities.

I/39. Main means of achieving objective: Meetings, publishing guidelines, training (including the use of Agency computer facilities).

I/40. Project planning and duration: In the period 1987-88, assistance to Member States with computer-aided safety analysis will continue. The Agency will make available on its computer additional digital codes allowing the more realistic calculation of system behaviour and accidental radioactive releases from an installation and the evaluation of how these are affected by changes in operating procedures under abnormal conditions or by limited design changes. Training of experts from Member States on the Agency computer has proved useful and will be continued. A technical committee meeting will be arranged annually to exchange information in this field.

I/41. Output: Increased ability of Member States to perform computer-aided safety analysis.

Project I.2.03

Implications of source term reassessment

I/42. Objective: To produce guidelines on and give assistance with the evaluation of the design and licensing implications of reassessed accident source terms for nuclear installations.

I/43. Addressee: Regulatory bodies, utilities, designers and constructors of nuclear facilities.

I/44. Main means of achieving objective: Meetings, publishing guidelines.

I/45. Project planning and duration: This project is to be initiated in 1986 and will be completed by 1988.

I/46. Output: Authoritative basis for the preparation of national guidelines consistent with internationally agreed requirements.

PROBLEM III

I/47. Member States need assistance in strengthening their capabilities in probabilistic safety assessment.

ASSESSMENT AND ANALYSIS

I/48. Probabilistic safety assessment is currently supplementing conventional safety methodology with a new quantitative approach for safety analysis and is acquiring growing importance in the safety evaluations of nuclear installations. Probabilistic safety analyses (PSAs) conducted in a limited number of developed countries have demonstrated that, in spite of uncertainties and limitations, the results are valuable for nearly all aspects of safety. Some countries are now requesting PSAs for all their new plants and developing Member States are starting to build up PSA teams. PSA is also becoming more important in the licensing process.

I/49. Present studies lack standardization and suffer from inadequate treatment of human error and dependent events. Furthermore, feedback of operating experience to improve the reliability of PSAs and to create a reliable data base is not being adequately exploited.

I/50. Plant-specific uses include design evaluation, emergency operating procedures, training of operators to cope with severe accidents, operator computer aids or backfitting decisions. More general considerations range from the development of quantitative safety goals and design objectives to general risk management providing a risk framework which can also be used for other energy systems and industrial installations.

ROLE OF THE AGENCY

I/51. The role of the Agency will be to facilitate international exchange of information and to encourage research and development activities on improved PSA modelling techniques, to provide guidance and assistance in the conduct, review and use of PSAs, and to develop, in co-operation with other United Nations organizations, a procedures guide for cost-effective risk management.

Project I.2.04

Development of guidance and provision of assistance for probabilistic safety assessment

I/52. Objective: To provide Member States with guidance on the conduct of PSAs (including reliability data and modelling techniques) and on the use of PSA results for safety decisions and as operator aids, and to assist Member States in performing and reviewing PSAs.

I/53. Addressee: National authorities responsible for nuclear safety, designers and operators of nuclear installations, nuclear research organizations.

I/54. Main means of achieving objective: Meetings, publishing guidelines, supporting research and development, training, supplying experts, assisting in the conduct and review of PSA studies.

I/55. Project planning and duration: The project was initiated with a CRP in 1983. Technical meetings reviewing progress in specific subjects have been organized and an interregional TC project has been under way since 1985. This TC project is complemented by a series of training courses. During the period 1987-88, it is expected that several PSAs will be conducted in Member States, that progress will be made in modelling techniques and computer codes and that new uses of PSAs will emerge.

I/56. Output: Increased ability to carry out safety assessment studies.

Project I.2.05

Development of risk management procedures guide

I/57. Objective: To provide to Member States a comprehensive guide to risk assessment and management in the energy field including computer codes, data, methods, models and case studies.

I/58. Addressee: National authorities responsible for nuclear safety, safety in general and environmental protection, regulatory bodies, designers, energy utilities and planning authorities.

I/59. Main means of achieving objective: Meetings, supporting research, publishing guidelines, supplying experts, training.

I/60. Project planning and duration: Agreement has been reached with ILO, UNEP and WHO on the scope of this inter-agency project. A project document was finalized in November 1985 for presentation to the scientific community and national and international organizations at a meeting in April 1986. During the period 1987-88, work will concentrate mainly on co-ordinating case studies, resolving scientific issues and selecting computer codes. The procedures guide will be completed in 1990.

I/61. Output: Increased ability to perform risk management studies.

Area of Activity I.3
Safe Siting, Design and Construction of Nuclear Installations

PROBLEM I

I/62. Member States in the early stages of a nuclear power programme need assistance in the selection and evaluation of suitable sites.

ASSESSMENT AND ANALYSIS

I/63. Site selection and site evaluation are the first steps in a nuclear power programme. A good evaluation of site-related design parameters leads to an installation properly designed against site-related extreme events such as earthquake and floods. The Agency has already produced a comprehensive set of codes and safety guides on siting and many Member States are using these in their siting activities. However, additional guidelines are required to reflect new techniques and methodologies and to elaborate on related topics not adequately covered by these documents.

ROLE OF THE AGENCY

I/64. Having gained considerable experience in this area, the Agency is in a position to provide assistance to Member States which are performing site

investigations and to provide a forum for the collection and dissemination of new data which may become available with time or information on new site analysis techniques and methodologies.

Project I.3.01

Development and implementation of guidelines for the siting of nuclear installations

I/65. Objective: To prepare manuals supplementing existing NUSS safety codes and guides on the siting of nuclear facilities and to assist developing countries in performing site studies and investigations at different stages of the siting process (site survey, site evaluation and pre-operational stage).

I/66. Addressee: Regulatory bodies, utilities.

I/67. Main means of achieving objective: Meetings, publishing guidelines, training, supplying experts.

I/68. Project planning and duration: In the period 1987-88, it is planned to prepare one or two documents to supplement the NUSS code and safety guides already issued. Feedback from users of documents will be collected and minor revisions may be made to these documents.

I/69. It is also intended to provide both general assistance covering all aspects of siting (six regional and national training courses and workshops) as well as specific assistance to individual countries (four advisory missions and some 40-45 TC projects). These activities will concern both nuclear power plants and research reactors.

I/70. Output: Increased capability of Member States to draw up national regulations based on internationally agreed guidelines and to perform siting studies and investigations for nuclear power plants and research reactors.

PROBLEM II

I/71. Countries embarking on a nuclear power programme need to be able to establish that the design and construction of a nuclear power plant are such that the plant will meet safety criteria.

ASSESSMENT AND ANALYSIS

I/72. The complexity of a nuclear power plant is such that extensive experience is required in order to determine in the design review process whether safety criteria are satisfied. The basic safety philosophy and requirements can be fulfilled in various ways and different countries have different practices. The NUSS documents provide a well-founded method for specifying the basic requirements of nuclear power plants with regard to

safety. The translation of such design requirements into hardware and components, however, requires the proper application of technical expertise and standards. In the licensing review, guidance is needed on how this process should be carried out and which national regulations and standards are to be considered for detailed compliance.

ROLE OF THE AGENCY

I/73. The Agency's NUSS documents are a useful basis for the establishment of national regulations on the safety of nuclear power plants. As they are rather general in nature, however, a considerable amount of work remains to be done in order to implement them and establish a national system of regulations. In conjunction with the country supplying a nuclear power plant, the Agency can help with this work and thus ensure that the system is compatible with other nuclear power plants to be built in the country.

Project I.3.02

Development of guidance on and provision of assistance with the review of the design and construction of nuclear installations

I/74. Objective: To prepare manuals supplementing the existing NUSS code and guides on design and to assist Member States embarking on nuclear programmes to develop their capabilities to review the design and construction of nuclear facilities.

I/75. Addressee: Regulatory bodies, utilities, designers and constructors of nuclear power plants.

I/76. Main means of achieving objective: Meetings, publishing guidelines, supplying experts.

I/77. Project planning and duration: During the period 1987-88, it is intended to provide both general assistance (3-4 training courses or workshops and guidance on particular nuclear power plant designs (e.g. BWR, PHWR and PWR) and specific assistance to individual countries on all aspects of design and construction (two advisory missions and some 30 TC projects). Information collected from the users of NUSS codes and guides will be used for the revision of these documents.

I/78. Output: Increased capability of Member States' regulatory bodies to prepare national regulations based on internationally agreed guidelines and to perform independent safety reviews of the design and construction of nuclear power plants.

Area of Activity I.4
Operational Safety of Nuclear Installations

PROBLEM I

I/79. Member States need assistance in the operational safety aspects of nuclear power plants and research reactors.

ASSESSMENT AND ANALYSIS

I/80. As the number of nuclear power plants in operation increases, so operational safety assumes greater importance. Also, a large number of Member States have research reactors, many of which have been in operation for 15-30 years. The Agency has established codes and guides for the safe operation of nuclear plants and research reactors. Supplementary guidelines and operational safety review missions are needed to provide practical advice on how to implement Agency recommendations. There is also a need for analysis of abnormal events, trend identification, determination of general implications and dissemination of information in order that all countries can share in worldwide operating experience.

ROLE OF THE AGENCY

I/81. The Agency's worldwide membership has enabled it to draw up the NUSS codes and guides which represent an international consensus with respect to the operational safety approaches and practices of Member States. The Agency has also sent operational safety review teams (OSARTs) to nuclear power plants and safety missions to research reactors. It is thus appropriate for the Agency to continue to use the expertise it has developed in order to elaborate supplementary guidance and to conduct further missions in this area. The Agency will continue to collect detailed information on incidents at nuclear power plants for evaluation and timely dissemination of the results to participating countries.

Project I.4.01

Development of guidelines for the safe operation of nuclear installations

I/82. Objective: To prepare documents to supplement existing NUSS codes and guides on the operation of nuclear power plants and research reactors.

I/83. Addressee: Regulatory bodies, safety authorities and operators of nuclear power plants and research reactors.

I/84. Main means of achieving objective: Publishing guidelines, meetings.

I/85. Project planning and duration: In the period 1987-88, it is planned to prepare three additional guides for research reactors as well as two additional manuals to supplement the NUSS code and safety guides already issued. Feedback from the users of NUSS documents will be collected and minor revisions may be made as a result.

I/86. Output: Authoritative basis for the establishment of national regulations in the operational area consistent with internationally agreed guidelines.

Project I.4.02

Operational safety reviews of nuclear installations

I/87. Objective: To review safety aspects of nuclear power plant and research reactor operation to determine whether an adequate level of safety has been maintained during operation and to optimize safety.

I/88. Addressee: Regulatory bodies, safety authorities and operators of nuclear power plants and research reactors.

I/89. Main means of achieving objective: Supplying experts, meetings, publishing reports.

I/90. Project planning and duration: An average of 4-5 OSARTs (at the request of Member States) and the same number of missions to research reactors will be conducted each year. Seminars on the safety of two-loop PWRs and on safety aspects of research reactors and critical assemblies will be held in 1987 and 1988 respectively, and a symposium on the feedback of operational safety experience from nuclear power plants will be organized in 1988.

I/91. Output: Increased awareness of international approaches and practices in operational safety and improved local ability to conduct safety reviews of operating nuclear facilities.

Project I.4.03

Incident reporting system (IRS)

I/92. Objective: To maintain a worldwide data base (including input from OECD, CMEA and developing countries) on safety-related experience at nuclear power plants, to evaluate incidents, to disseminate information on the most significant items to participating Member States and to provide assistance in their interpretation.

I/93. Addressee: Regulatory bodies, safety authorities and designers, constructors, manufacturers and operators of nuclear power plants.

I/94. Main means of achieving objective: Maintaining a data base, publishing reports, meetings.

I/95. Project planning and duration: The project was formally initiated in 1983. During the period 1987-88 it is intended to strengthen IRS activities through more timely reporting and the submission of more detalied data on significant items and on the measures taken to resolve them. A technical committee and joint IAEA/NEA meeting will be held annually to exchange information on incidents.

I/96. Output: Greater awareness of worldwide safety-related experience, the cause of incidents and how they can be corrected, and increased capability of Member States to interpret events of safety significance in their own countries.

Area of Activity I.5
Physical Protection of Nuclear Installations and Materials

PROBLEM I

I/97. Relevant government agencies need to develop and improve the organizational and technical aspects of the physical protection of nuclear installations and materials.

ASSESSMENT AND ANALYSIS

I/98. The Convention on the Physical Protection of Nuclear Material was established under the auspices of the Agency which has since published a document on the subject. There is a need to promote the implementation of the guidelines and recommendations contained therein.

ROLE OF THE AGENCY

I/99. The worldwide membership of the Agency has enabled it to draw up a convention and a guidance document on the physical protection of nuclear material which reflect international consensus in this area. It is appppropriate to use the expertise of the Agency in promoting the implementation of the recommendations set out in that document.

Project I.5.01

Establishment and maintenance of a specialized training programme in the physical protection of nuclear installations and materials

I/100. 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/101. Addressee: Regulatory bodies, safety authorities and operators responsible for nuclear facilities and materials.

I/102. Main means of achieving objective: Training.

I/103. Project planning and duration: At least one international training course per year will be conducted.

I/104. Output: Improved awareness of international approaches and practices in the physical protection of nuclear facilities and materials.

Summary of budget estimates by Area of Activity

Table 32

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
I.1. Safety Principles and Regulatory Organization	520 000	(26 000)	(5.0)	494 000	98 000	19.8	592 000	3.0	509 000	4.6	638 000
I.2. Safety Research and Analysis	902 000	148 000	16.4	1 050 000	(7 000)	(0.7)	1 043 000	3.1	1 083 000	4.8	1 127 000
I.3. Safe Siting, Design and Construction of Nuclear Installations	540 000	(107 000)	(19.8)	433 000	(115 000)	(26.6)	318 000	3.7	449 000	4.3	344 000
I.4. Operational Safety of Nuclear Installations	873 000	(222 000)	(25.4)	651 000	61 000	9.4	712 000	2.9	670 000	4.6	766 000
I.5. Physical Protection of Nuclear Installations and Materials	7 000	-	-	7 000	-	-	7 000	-	7 000	-	7 000
Safety Aspects of Quality Assurance (Abolished)	25 000	(25 000)	(100.0)	-	-	-	-	-	-	-	-
SNSP (Net)	-	897 000	-	897 000	305 000	34.0	1 202 000	3.5	930 000	4.8	1 304 000
Programme I Total	2 867 000	665 000	23.2	3 532 000	342 000	9.7	3 874 000	3.3	3 648 000	4.6	4 186 000

Summary of main means by Area of Activity

Table 33

Area of Activity	Man-years a/ P	Man-years a/ GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	SNSP (Net) b/	TC support & advisory services	Total	Responsible Division
	1987/1988 Estimates (Regular Budget)											
I.1. Safety Principles and Regulatory Organization	4.6	2.4	207 000	-	710 000	-	-	-	-	230 000	1 147 000	NENS
I.2. Safety Research and Analysis	12.6	10.0	260 000	-	1 210 000	-	-	410 000	-	330 000	2 210 000	NENS
I.3. Safe Siting, Design and Construction of Nuclear Installations	4.6	2.4	-	-	600 000	-	-	-	-	193 000	793 000	NENS
I.4. Operational Safety of Nuclear Installations	13.0	9.2	230 000	-	680 000	-	-	126 000	-	400 000	1 436 000	NENS
I.5. Physical Protection of Nuclear Installations	0.2	-	-	-	-	-	-	-	-	14 000	14 000	NENS
Supplementary Nuclear Safety Programme (SNSP) (Net)	a/	a/	-	-	-	-	-	-	2 234 000	-	2 234 000	NENS
Programme I Total	35.0	24.0	697 000	-	3 200 000	-	-	536 000	2 234 000	1 167 000	7 834 000	

a/ Does not include possible additional manpower for the SNSP.

b/ The "main means" of implementing the SNSP have not yet been decided.

Programme Area 3: List of projects and estimated resources for 1987/1988

Table 34

		Project	Estimated Resources for 1987/1988			
			Regular Budget	TC resources	Extra-budgetary resources a/	Total
Programme I		SAFETY OF NUCLEAR INSTALLATIONS				
Area of Activity						
I.1.		Safety Principles and Regulatory Organization				
	I.1.01	Development of safety principles	587 000	81 000	86 000	754 000
	I.1.02	Development and implementation of guidelines for regulating safety	560 000	864 000	-	1 424 000
I.1.		Sub-Total	1 147 000	945 000	86 000	2 178 000
I.2.		Safety Research and Analysis				
	I.2.01	Exchange of information on safety issues and research	530 000	62 000	-	592 000
	I.2.02	Assistance with safety assessment	500 000	1 144 000	-	1 644 000
	I.2.03	Implications of source term reassessment	180 000	-	-	180 000
	I.2.04	Development of guidance and provision of assistance for probabilistic safety assessment	650 000	885 000	-	1 535 000
	I.2.05	Development of risk management procedures guide	350 000	136 000	-	486 000
I.2.		Sub-Total	2 210 000	2 227 000	-	4 437 000
I.3.		Safe Siting, Design and Construction of Nuclear Installations				
	I.3.01	Development and implementation of guidelines for the siting of nuclear installations	398 000	1 414 000	-	1 812 000
	I.3.02	Development of guidance on and provision of assistance with the review of the design and construction of nuclear installations	395 000	776 000	-	1 171 000
I.3.		Sub-Total	793 000	2 190 000	-	2 983 000
I.4.		Operational Safety of Nuclear Installations and Materials				
	I.4.01	Development of guidelines for the safe operation of nuclear installations	720 000	208 000	25 000	953 000
	I.4.02	Operational safety reviews of nuclear installations	276 000	732 000	-	1 008 000
	I.4.03	Incident reporting system (IRS)	440 000	142 000	-	582 000
I.4.		Sub-Total	1 436 000	1 082 000	25 000	2 543 000
I.5.		Physical Protection of Nuclear Installations and Materials				
	I.5.01	Establishment and maintenance of a specialized training programme in the physical protection of nuclear installations and materials	14 000	167 000	-	181 000
I.5.		Sub-Total	14 000	167 000	-	181 000
		SNSP (Net)	2 234 000	-	-	2 234 000
Programme I		Safety of Nuclear Installations	7 834 000	6 611 000	111 000	14 556 000
Total Programme Area 3		Nuclear Safety and Radiation Protection	13 580 000	14 056 000	198 000	27 834 000

a/ Includes funds from other UN organizations.

PROGRAMME AREA 4

SAFEGUARDS

Summary of resources by programme

Table 35

Programme	Man-years		Planned expenditure for the implementation of the programme in 1987/1988				
	P	GS	Regular Budget estimates	Funds from other UN organizations	TC resources	Other extra-budgetary resources	Total
J. Safeguards	554.0 [11.8]	382.0 [29.0] [7.8] M&O	70 685 000	-	-	7 040 000	77 725 000
Programme Area 4	554.0	382.0	70 685 000	-	-	7 040 000	77 725 000

Note: The manpower figures shown in parenthesis represent the number of man-years of Agency Laboratory staff working for that particular programme.

PROGRAMME J: SAFEGUARDS

Area of Activity J.1
Information Treatment

Activity J.1.01

To maintain and operate the IAEA Safeguards Information System

J/1. Objective: To collect, store, and process accounting reports, transfer notifications and relevant parts of the design information submitted by States, data acquired during inspections and the results therefrom and to maintain a computer-based information system to provide services in connection with the use of this information.

J/2. Means of achieving objective: Checking accounting reports submitted by States; inputting data to the data base; extracting reports from the data base; maintaining, and making modifications to, software as required on a day-to-day basis; monitoring the efficient use of computer equipment.

J/3. Planning: States which have negotiated safeguards agreements with the Agency undertake to submit regularly 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, as provided for in agreements.

J/4. 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. Agency inspectors prepare inspection reports on the data acquired during inspections and the results derived therefrom.

J/5. The IAEA Safeguards Information System (ISIS) has been developed in order to process the above data in a timely manner and to process data connected with the management of the Department of Safeguards. ISIS is based on a distributed data processing system which includes different mainframes and personal computers and utilizes a centralized data base.

J/6. The volume of data to be processed is increasing in proportion to the level of inspection carried out and the number of installations under safeguards or containing safeguarded material. It is expected that accounting reports submitted by States will number 26 000 and 28 000 in 1987 and 1988 respectively, compared with 24 000 in 1986. The increase in the volume of international transfers results in a corresponding increase in workload because of the transit matching required.

Activity J.1.02

To develop the IAEA Safeguards Information System

J/7. Objective: To provide the Department of Safeguards with improved information processing services by testing and establishing computer-based system components using new integrated information technology in the fields of nuclear material accountancy and management information.

J/8. Means of achieving objective: Analysing requirements, preparing feasibility studies, carrying out systems analysis and design, programming, implementing new or enhanced systems.

J/9. Planning: ISIS will be reviewed and application plans and related system architecture will be established, meeting the Department's long-term information processing requirements. It is expected that this review will be completed in 1987.

J/10. Elements of the ISIS system relating to the INFCIRC/153-type nuclear material accounting system (including material transfers) will be updated in order to bring them into line with information needs for operational use.

J/11. Computer support for INFCIRC/66-type nuclear material accounting and for material-in-transit will be developed.

J/12. ISIS components pertaining to inspection reporting (including improved quality control) and the automated generation of statements and SIR information will be expanded.

J/13. Improved computerized components to assist safeguards management will be developed.

Area of Activity J.2
Safeguards Operations

Activity J.2.01

Verification

J/14. Objective: States have concluded safeguards agreements with the Agency which require verification by inspection of compliance with the provisions and procedures of the agreements. The objective is to verify by inspection that materials at facilities are present as reported, that corresponding records are kept as agreed and that they are consistent with the reports submitted to the Agency.

J/15. Means of achieving objective: Inspection scheduling and planning, inspecting, evaluating inspection results, follow-up action, reporting on the results of inspection, including the despatch of statements to States.

J/16. Planning: Goal attainment is a vital objective of safeguards and a major part of the Department of Safeguards' planning is aimed at increasing the proportion of inspection goals attained. The innovations and improvements introduced in recent years in order to achieve greater managerial efficiency and more rational use of manpower will continue to be consolidated.

J/17. Inspection goals are established for all types of facility under safeguards. They are derived from Agency detection goals and reflect actual conditions at the facility and the requirements prescribed by safeguards agreements. Safeguards implementation and the attainment of inspection goals depend on the co-operation of States and operators and on the availability of manpower, safeguards equipment, inspection support and financial resources.

J/18. An actual routine inspection effort (ARIE), representing the number of man-days of inspection per year estimated to be required under normal operating conditions to attain inspection goals, has been determined for each facility. A further value, the planned routine inspection effort (PLARIE), takes into account anticipated changes in the operational status of the facility. The total PLARIE for a specific year therefore represents the number of man-days of inspection which would be carried out in that year if there were no resource limitations: under normal operating conditions it would usually be equal to ARIE. The Agency's plans, therefore, reflect the long-term aims of achieving progressively higher PLARIE coverage. During the past two years, coverage in non-nuclear-weapon States of the inspection effort required by Subsidiary Arrangements has remained static at about 70%. The slight increase in PLARIE figures foreseen for 1987 and 1988 will be met by the planned increase in the average number of man-days per inspector at facilities to 51. PLARIE coverage is therefore expected to remain at around the 70% level during the period 1987-88.

J/19. Goal attainment rather than PLARIE coverage is the fundamental aim of inspection, however. It cannot be stated that 100% PLARIE coverage would equate to 100% goal attainment because other factors may affect goal attainment.

J/20. In order to take fuller advantage of the voluntary offers of nuclear-weapon States to submit all or part of their peaceful nuclear activities to safeguards and to broaden the Agency's experience with certain types of facility, the number of days of inspection which it is planned to carry out under voluntary offer agreements with certain nuclear-weapon States will be increased in 1987 and 1988.

Area of Activity J.3
Development and Technical Support

Activity J.3.01

Research and Development

J/21. Objective: To provide the Operations Divisions with improved or new equipment, techniques and procedures for safeguards measurement, containment

and surveillance in order to ensure maximum technical effectiveness and efficiency; 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; to develop methods of optimizing inspection effort.

J/22. Means of achieving objective: Using Professional staff as well as consultants and experts provided under various support programmes; holding meetings; developing instruments and containment and surveillance equipment through support programme funds; co-ordinating national support programmes; maintaining contact with State authorities and operators during the development of equipment.

J/23. Planning: This programme is composed of a number of projects which will continue over several years and of some which are expected to be completed in 1987 and 1988. In addition to research and development activities financed from the Regular Budget, the contributions made under Member States' support programmes, which are expected to amount to about $15 million by the year 1987, will be co-ordinated.

J/24. In the area of the development of instruments, methods and techniques, most of the research and development programme activities undertaken in 1985-86 will be continued and in some cases expanded. Particular emphasis is expected to be placed on the following three activities.

J/25. First, the performance monitoring and control programme will be extended with emphasis being placed on new equipment for the automatic gathering and presentation of performance data.

J/26. Secondly, the development of authentication techniques will become increasingly important for new facilities which feature an automatic process with limited access. In order to produce a credible, practical, cost-effective and tamper-indicating system for this type of environment, careful attention must be paid to the individual features of the instrument, facility and technique being deployed .

J/27. Thirdly, high priority will continue to be assigned to new optical surveillance systems and in particular to the development of a highly reliable cost-effective closed circuit television system to complement and eventually replace existing photographic surveillance systems.

J/28. Other development activities are also foreseen. The safeguards approach for a heavy water production plant - the first of its kind under Agency safeguards - will be implemented. Instrumentation for material balance and process control data will be installed, tested and evaluated. It is expected that the plant will start up in 1988 and that the test and demonstration project will be completed in 1989.

J/29. The "limited frequency unannounced access" safeguards approach for centrifuge enrichment plants will be further developed. This is particularly important in view of the significant rise that will occur in the next few years in the number and capacity of enrichment facilities where this approach is expected to be implemented. It is planned to complete development in 1987.

J/30. 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 and containment and surveillance instrumentation and safeguards procedures for these facilities will therefore need to be tested and evaluated. A prototype laser-based surveillance system for spent fuel storage ponds will be further developed and tested at storage facilities. These activities are expected to be completed in 1988.

J/31. The quality of NDA (non-destructive assay) data is strongly dependent on the calibration curve and representativeness of the standards used for this purpose. Efforts will therefore focus on developing an integrated approach to the deployment and use of standards for NDA measurements.

J/32. Methods of improving the timeliness of safeguards measurements will be studied and summarized with the objective of specifying equipment that better meets the timeliness guidelines. This project is planned for completion in 1988.

J/33. In the systems studies area, safeguards approaches based on advanced concepts and methods aimed at increasing the effectiveness and efficiency of safeguards will be tested. Models for safeguarding different types of nuclear facility will be updated. Guidelines for the application of safeguards approaches and advanced safeguards methods will be prepared. The main development activities in this area are described below.

J/34. Safeguards approaches will be developed and tested for various types of facility, including large-scale reprocessing plants, automated MOX (mixed oxide) fuel fabrication plants, large critical facilities, enrichment plants employing advanced enrichment technologies and heavy water production plants.

J/35. Standard inspection procedures for safeguarding different types of nuclear facility, including long-term away-from-reactor storage of spent fuel, LEU fuel fabrication plants and on-load refuelled reactors, will be updated.

J/36. Safeguards concepts and methods applicable to multiple facility nuclear fuel cycles (fuel cycles incorporating LWRs, for example) will be developed and tested.

J/37. Techniques for forecasting manpower requirements and amounts of nuclear material subject to safeguards will be further developed and refined.

J/38. The development, testing and implementation of measures for assessing safeguards effectiveness will be continued, with emphasis on establishing the relationship between safeguards effectiveness and inspection goal attainment. This work complements that being carried out in the evaluation area.

J/39. Methodologies for optimizing the allocation of inspection effort at facility and State levels will continue to be developed. This work will include the formulation of long-term goals, the evaluation of financial, equipment and manpower requirements and the utilization and allocation of inspection effort within existing limitations. These activities are planned to be completed during 1988.

Activity J.3.02

Provision of technical services

J/40. Objective: To provide safeguards inspectors with the necessary equipment, properly maintained and calibrated, and with the procedures for its use; to provide services such as the development of photographic surveillance films and the checking of seals and to provide assistance in connection with the taking and shipping of samples for destructive analysis .

J/41. Means of achieving objective: Providing instruments, seals and equipment; instructing inspectors in the use of instruments and application of techniques; making arrangements for shipment and analysis of samples; specifying and procuring physical standards and reference materials; formulating procedures for implementing containment and surveillance or materials measurement techniques; checking seals; developing films; operating facilities for the testing, repair and maintenance of photo, video, and NDA equipment; providing services for equipment procurement, inventory control and shipping/receiving, including customs documentation.

J/42. Planning: The effort required increases principally with the quantity of equipment in regular use, the volume of seals to be processed, the number of films to be developed and the number of destructive samples taken. The inventory of equipment will continue to rise with the investment of over $2 million each year in new items. The number of samples requiring analysis is expected to increase from 1500 in 1985 and 2100 in 1986 to around 2500 in 1987 and 1988. The volume of seals requiring processing is expected to increase at an annual rate of about 10% and the number of films to be developed at an annual rate of about 20%.

Area of Activity J.4
Safeguards Evaluation

Activity J.4.01

To monitor and evaluate safeguards effectiveness

J/43. Objective: To monitor and evaluate the effectiveness of safeguards activities, to prepare comparative studies and summaries, to prepare the SIR, to formulate recommendations for improvements and to support other units in the area of statistical methods and data analysis.

J/44. Means of achieving objective: Collecting information on all types of safeguards activity in the field, at Headquarters and at field offices; producing the SIR; following up the action plan to solve SIR problems; reviewing documentation resulting from inspections; quality assurance; carrying out internal reviews of safeguards activities; providing data analysis and evaluation services.

J/45. Planning: In the long term, the effort needed to carry out this function generally increases in line with growth in inspection activities.

Activity J.4.02

To develop evaluation methods

J/46. Objective: To ensure that the Agency has adequate methods and techniques to evaluate safeguards' effectiveness.

J/47. Means of achieving objective: Using Professional staff as well as consultants and experts provided under various support programmes, holding meetings.

J/48. Planning: Long-term safeguards criteria will be further developed and major improvements will be made to the methods of reporting the results of inspection, including the production of statements.

J/49. Statistical techniques will be improved as regards both data analysis and the development of sampling plans.

J/50. NDA techniques will be assessed in order to improve equipment performance. This work will include further evaluation of data associated with the characterization of NDA reference materials as well as instrument calibration data and the analysis of measurement errors.

J/51. Quality control of measurement methods will be improved by, inter alia, conducting inter-laboratory comparisons.

J/52. Isotopic correlation techniques for the verification of fuel reprocessing plant inputs will be further developed by comparing field test results with theoretical predictions. Software will be developed to assist rapid data analysis. It is expected that this project will be completed in 1988.

J/53. Methods of assessing safeguards effectiveness will be further tested by analysing inspection results from power reactors, fuel fabrication plants, reprocessing plants and other facilities.

J/54. Tank calibration procedures will be further developed and assessed with a view to reducing levels of both systematic and random errors.

Area of Activity J.5
Standardization, Training and Administrative Support

Activity J.5.01

To provide standardization, training and administrative support to the Department of Safeguards

J/55. Objective: To assist the Deputy Director General in tasks connected with the management of the Department of Safeguards, to furnish administrative support to other safeguards units, to ensure the standardization of procedures in safeguards, and to provide the training necessary to support effective safeguards activities.

J/56. Means of achieving objective: Preparing standardized procedures; maintaining the Safeguards Manual; maintaining the departmental repository of Subsidiary Arrangements, including Facility Attachments; participating in the work of negotiating teams; providing administrative support in such areas as personnel, budget and financial planning, meetings, designation of inspectors, public information, and travel; providing a secretariat for SAGSI; organizing and carrying out training of inspectors, other staff of the Department as necessary and personnel from Member States in areas of specific relevance; evaluating the training programme.

J/57. Planning: The effort required increases with the overall growth in the level of safeguards activities and the size of the Department of Safeguards.

Summary of budget estimates by Area of Activity

Table 36

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
J.1. Information Treatment	3 899 000	465 000	11.9	4 364 000	315 000	7.2	4 679 000	3.3	4 506 000	4.7	5 059 000
J.2. Safeguards Operations	16 558 000	(14 000)	(0.1)	16 544 000	181 000	1.1	16 725 000	3.2	17 067 000	5.0	18 120 000
J.3. Development and Technical Support	9 804 000	(665 000)	(6.8)	9 139 000	(355 000)	(3.9)	8 784 000	3.7	9 475 000	4.5	9 522 000
J.4. Safeguards Evaluation	1 676 000	54 000	3.2	1 730 000	52 000	3.0	1 782 000	2.8	1 779 000	5.0	1 924 000
J.5. Standardization, Training and Administrative Support	1 404 000	88 000	6.3	1 492 000	83 000	5.6	1 575 000	2.9	1 535 000	4.8	1 698 000
Programme J Total	33 341 000	(72 000)	(0.2)	33 269 000	276 000	0.8	33 545 000	3.3	34 362 000	4.8	36 323 000

Summary of main means by Area of Activity

Table 37

Area of Activity	Man-years P	Man-years GS	Meetings	Database	Publishing	Inspecting a/	Standards, regulations	Research & development	Administrative support & training	Total	Responsible Division
	1987/1988 Estimates (Regular Budget)										
J.1. Information Treatment	58.0	72.0	-	8 609 000	-	-	-	956 000	-	9 565 000	SGIT
J.2. Safeguards Operations	364.0	190.0	-	-	-	35 187 000	-	-	-	35 187 000	SGOA,SGOB,SGOC
J.3. Development and Technical Support	66.0 [11.8]	62.0 [29.0] [7.8]M&O	-	-	-	15 198 000	-	3 799 000	-	18 997 000	SGDE
J.4. Safeguards Evaluations	42.0	30.0	-	-	-	3 148 000	-	555 000	-	3 703 000	SGEV
J.5. Standardization, Training and Administrative Support	24.0	28.0	-	-	-	-	1 080 000	-	2 153 000	3 233 000	SGSA
Programme J Total	554.0	382.0	-	8 609 000	-	53 533 000	1 080 000	5 310 000	2 153 000	70 685 000	

a/ This comprises all safeguards implementation activities.

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

Programme Area 4: List of activities and estimated resources for 1987/1988

Table 38

	Activity	Estimated Resources for 1987/1988 Regular Budget	TC resources	Extra-budgetary resources a/	Total
Programme J Area of Activity	Safeguards				
J.1.	Information Treatment				
J.1.01	To maintain and operate ISIS	8 609 000	-	-	8 609 000
J.1.02	To develop ISIS	956 000	-	-	956 000
J.1.	Sub - Total	9 565 000	-	-	9 565 000
J.2.	Safeguards Operations				
J.2.01	Verification	35 187 000	-	-	35 187 000
J.2.	Sub - Total	35 187 000	-	-	35 187 000
J.3.	Development and Technical Support				
J.3.01	Research and development	3 799 000	-	7 040 000	10 839 000
J.3.02	Provision of technical services	15 198 000	-	-	15 198 000
J.3.	Sub - Total	18 997 000	-	7 040 000	26 037 000
J.4.	Safeguards Evaluation				
J.4.01	To monitor and evaluate safeguards effectiveness	3 148 000	-	-	3 148 000
J.4.02	To develop evaluation methods	555 000	-	-	555 000
J.4.	Sub - Total	3 703 000	-	-	3 703 000
J.5.	Standardization,Training and Administrative Support				
J.5.01	Standardization,training and administrative support	3 233 000	-	-	3 233 000
J.5.	Sub - Total	3 233 000	-	-	3 233 000
Programme J	Safeguards	70 685 000	-	7 040 000	77 725 000

a/ Resources provided under national support programmes.

Installations subject to safeguards or containing safeguarded material in non-nuclear-weapon States

(1985 to 1989)

Table 39

Type of installation	1985		1986		1987		1988		1989	
	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	NPT and/or Tlatelolco agreements	INFCIRC/66 -type agreements	NPT and/or Taltelolco agreements	INFCIRC/66 -type agreements
Power reactors	146	26	155	27	165	29	172	32	179	32
Research reactors and critical assemblies	151	26	154	26	154	27	155	29	156	29
Conversion plants	4	2	4	2	4	2	4	2	4	2
Fuel fabrication plants	28	9	29	9	30	9	30	9	31	9
Reprocessing plants	4	2	4	2	4	2	4	2	4	2
Enrichment plants	5	0	5	1	6	2	6	2	6	2
Separate storage facilities	28	2	31	2	34	2	34	2	34	2
Other facilities (>1 ekg)	39	2	39	3	39	3	39	3	39	3
Other locations (≤1 ekg)	385	28	385	28	385	28	385	28	385	28
Non-nuclear installations	0	2	0	2	0	2	0	2	0	2
TOTAL	790	99	806	102	821	106	829	111	838	111

Amounts of nuclear material under Agency safeguards

in non-nuclear-weapon States

(Status as of 31 December 1985 and forecast for 1987 and 1992)

Table 40

Material	Amounts (tonnes)					
	1985		1987		1992	
	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	117.5	11.5	150-165	17-20	290-340	40-50
Uranium enriched to 20% or more	11.9	0.4	11.9	0.4	11.9	0.4
Uranium enriched to less than 20%	19 200	1300	22 000-25 000	1800-2200	40 000-45 000	4000-5000
Source material	28 000	1530	30 000-33 500	2000-2400	42 000-48 000	4000-5000

PROGRAMME AREA S

DIRECTION AND SUPPORT

Summary of resources by programme

Table 41

Programme	Man-years P	Man-years GS	Planned expenditure for the implementation of the programme in 1987/1988: 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	40.0	34.0	12 265 000	-	-	-	12 265 000
S.2. Administration	112.0	182.0	16 055 000	-	-	-	16 055 000
S.3. T.C. Servicing and Co-ordination	82.0	124.0	10 756 000	-	-	-	10 756 000
S.4. General Services	20.0	142.0 52.0 M&O	21 382 000	-	-	-	21 382 000
S.5. Specialized Service Activities	48.2	84.6	10 404 000	-	915 000	-	11 319 000
S.6. Shared Support Services a/	234.0	430.0 44.0 M&O	2 007 000 [35 054 000] b/	-	-	-	2 007 000 [35 054 000]
Programme Area S	536.2	996.6 96.0 M&O	72 869 000	-	915 000	-	73 784 000

a/ All costs except those of the Library have been allocated to the user programmes. Contracts Administration Services, Conference Services, Translation and Records Services, Data Processing Services and Printing and Publishing Services are shared by the user programmes. Interpretation is allocated to meetings; the Medical Services are allocated to Personnel Services. 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.

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 advice of the SAC, and to supervise its 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. In 1987, it is planned to initiate evaluation of the Agency's technical programmes in order to improve their effectiveness. The relevant duties will be carried out in the Office of the Director General with the aim of providing assistance to programme managers regarding the development and adaptation of evaluation methodology and of maintaining an overview of the implementation of the evaluation process.

S/2. 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 internal audit and management, budget and finance, personnel, legal and external relations services, in addition to the linguistic services and the "General Services" programme.

S/3. The aim of the Offices of the Deputy Director General for Research and Isotopes, for Technical Co-operation, for Nuclear Energy and Safety and for Safeguards is to advise and assist the Director General in matters concerning the planning and implementation of the Agency's scientific 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/4. The aim is to provide the organizational and administrative services required by the Policy-making Organs of the Agency, namely the General Conference and the Board of Governors.

Summary of budget estimates by Area of Activity

Table 42

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
S.1.1 General Management	2 151 000	(79 000)	(3.7)	2 072 000	57 000	2.8	2 129 000	3.0	2 135 000	4.8	2 300 000
S.1.2 Secretariat of the Policy-making Organs	3 726 000	(45 000)	(1.2)	3 681 000	20 000	0.5	3 701 000	3.5	3 809 000	5.0	4 021 000
Programme S.1. Total	5 877 000	(124 000)	(2.1)	5 753 000	77 000	1.3	5 830 000	3.3	5 944 000	4.9	6 321 000

Summary of main means by Area of Activity

Table 43

Area of Activity		1987/1988 Estimates (Regular Budget)									
		Man-years P	Man-years GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	Management and direction	Total	Responsible Division
S.1.1	General Management	34.0	30.0	-	-	-	-	-	-	4 435 000	4 435 000	Offices of DG DDG-AD DDG-RI DDG-NE DDG-TC DDG-SG
S.1.2	Secretariat of the Policy-making Organs	6.0	4.0	-	-	-	-	-	-	7 830 000	7 830 000	SEC
Programme S.1. Total		40.0	34.0	-	-	-	-	-	-	12 265 000	12 265 000	

PROGRAMME S.2

ADMINISTRATION

Area of Activity S.2.1
External Relations

S/5. 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 the Permanent Missions with protocol services.

S/6. Particular efforts will be required in 1987 in connection with the United Nations Conference for the Promotion of International Co-operation in the Peaceful Uses of Nuclear Energy (UNCPICPUNE).

Area of Activity S.2.2
Legal Advice

S/7. 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/8. Advisory services will continue to be provided to developing Member States upon request in the framing and preparation of nuclear legislation. In addition, in-service training with the Legal Division will continue to be provided under the Agency's technical co-operation programme or the UN/UNITAR fellowship programme in international law.

S/9. Support will be provided for technical co-operation training courses relating to, or involving, legal and regulatory aspects of nuclear energy.

S/10. The Standing Committee established under the Vienna Convention on Civil Liability for Nuclear Damage will be convened in 1987 to review the Convention ten years after its entry into force and to consider means of maintaining its continued harmony with the Paris Convention of 1960, as amended in 1982.

S/11. It may be necessary to hold in 1988 a conference for the revision of the Vienna Convention, if one-third of the contracting parties so request, in accordance with Article XXVI thereof.

S/12. It is planned to draw up guidelines on legal aspects of transboundary considerations relating to nuclear installations and to this end a meeting of experts may be convened in 1988, in co-operation with the Division of Nuclear Safety.

Area of Activity S.2.3
Internal Audit and Management

S/13. The aim is mainly to provide the Agency's management with independent appraisal services to assist them in discharging their responsibilities. These services include financial audit, economy and efficiency audit, management services and co-ordination and administrative services.

Area of Activity S.2.4
Personnel Services

S/14. The aim is to provide the Agency with personnel management and staff services in order to ensure efficient manpower utilization and just conditions of employment.

S/15. 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/16. Recruitment procedures will be monitored with a view to shortening delays, improving selection methods and obtaining more applications from qualified women. Also, as part of efforts to substantially increase the number of staff members drawn from developing areas, a traineeship programme for young graduates (about 15 per year) from developing Member States will continue in 1987.

Area of Activity S.2.6
Budget and Finance

S/17. 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/18. The process of adapting the preparation and presentation of the budget to a more results-oriented approach has been further developed with the intention of reporting on the implementation of programmes not only in financial terms but also in terms of programme execution. For this purpose, the concept of measuring activities in terms of volume and not only in terms of expenditure will be further developed.

S/19. Work will continue on a computerized financial management system (the cost of which has been absorbed without an increase in resources), which will enable information to be provided in terms of fund, programme or organizational structure. The benefits of adequate control and consistent information obtained from this system will be enhanced by efforts to further simplify and streamline administrative procedures.

Summary of budget estimates by Area of Activity

Table 44

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
S.2.1 External Relations	1 120 000	(14 000)	(1.3)	1 106 000	2 000	0.2	1 108 000	3.3	1 142 000	5.3	1 205 000
S.2.2 Legal Advice	446 000	(21 000)	(4.7)	425 000	22 000	5.2	447 000	2.1	434 000	5.0	479 000
S.2.3 Internal Audit and Management	487 000	83 000	17.0	570 000	3 000	0.5	573 000	3.2	588 000	5.2	622 000
S.2.4 Personnel Services	2 379 000	326 000	13.7	2 705 000	48 000	1.8	2 753 000	3.6	2 802 000	4.6	2 984 000
S.2.6 Budget and Finance	2 718 000	-	-	2 718 000	16 000	0.6	2 734 000	3.8	2 820 000	5.0	2 979 000
Programme S.2. Total	7 150 000	374 000	5.2	7 524 000	91 000	1.2	7 615 000	3.5	7 786 000	4.9	8 269 000

Summary of main means by Area of Activity

Table 45

Area of Activity	Man-years P	Man-years GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	Administrative support	Total	Responsible Division
	1987/1988 Estimates (Regular Budget)										
S.2.1 External Relations	16.0	26.0	-	-	-	-	-	-	2 347 000	2 347 000	ADEX
S.2.2 Legal Advice	16.0	8.0	-	-	-	-	-	-	913 000	913 000	ADLG
S.2.3 Internal Audit and Management	14.0	12.0	-	-	-	-	-	-	1 210 000	1 210 000	ADIT
S.2.4 Personnel Services	24.0	48.0	-	-	-	-	-	-	5 786 000	5 786 000	ADPR
S.2.6 Budget and Finance	42.0	88.0	-	-	-	-	-	-	5 799 000	5 799 000	ADBF
Programme S.2. Total	112.0	182.0	-	-	-	-	-	-	16 055 000	16 055 000	

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 from developing Member States are properly appraised and prepared for approval, to organize the smooth implementation of technical co-operation projects and to procure goods and services for projects and programmes. Close monitoring of project implementation, which was initiated in 1986, will continue.

S/21. It is expected that the 1987 programme will show an overall growth of 12% in comparison with 1986. At this growth rate, programme volume will reach almost $50 million by 1988. Further increases are foreseen in the number of projects, expert assignments, fellows and training course participants and in equipment disbursements. Regional and sub-regional programmes will become increasingly important and mechanisms for improving the quality and quantity of skilled manpower in certain regions will be studied.

S/22. In line with policy guidelines, programming missions and pre-project support assignments will continue to be sent to Member States requiring assistance in the programming and planning of projects.

Area of Activity S.3.2
Co-ordination and Supporting Activities

S/23. The objective is to work together with all Agency Divisions involved in technical co-operation activities as well as with development agencies in recipient countries and atomic energy institutions in the forward planning of programme resources, in monitoring and evaluating the utilization of resources available for technical co-operation activities and in providing policy support.

S/24. By the end of 1986 the computerized management information system will cover all technical co-operation funds and activities, including training courses. Efforts will be made to enable all interested parties to have ready access to information relating to technical co-operation programmes through on-line retrieval of data.

S/25. It is planned each year to carry out approximately 60 project evaluations and one or two large process evaluations and to prepare 800 individual interim project implementation reports. Also, efforts to provide national project staff with training on project design and evaluation will be increased.

Summary of budget estimates by Area of Activity

Table 46

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
S.3.1 Operations	3 920 000	50 000	1.3	3 970 000	60 000	1.5	4 030 000	3.4	4 103 000	5.0	4 376 000
S.3.2 Co-ordination and Supporting Activities	1 102 000	(36 000)	(3.3)	1 066 000	15 000	1.4	1 081 000	3.6	1 104 000	4.7	1 173 000
Programme S.3. Total	5 022 000	14 000	0.3	5 036 000	75 000	1.5	5 111 000	3.4	5 207 000	5.0	5 549 000

Summary of main means by Area of Activity

Table 47

Area of Activity	1987/1988 Estimates (Regular Budget)										
	Man-years P	Man-years GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	TC Administrative support & services	Total	Responsible Division
S.3.1 Operations	64.0	108.0	-	-	-	-	-	-	8 479 000	8 479 000	TCAC
S.3.2 Co-ordination and Supporting Activities	18.0	16.0	-	-	-	-	-	-	2 277 000	2 277 000	TCAC
Programme S.3. Total	82.0	124.0	-	-	-	-	-	-	10 756 000	10 756 000	

PROGRAMME S.4

GENERAL SERVICES

Area of Activity S.4.1
VIC Maintenance and Operation

S/26. The responsibility for the maintenance and operation of the VIC rests with the UNIDO Buildings Management Services and the UN Security and Safety Services. The cost of these services are shared among the users, namely UN, UNIDO and the IAEA, the Agency's share amounting to 45.5%. The main items of expenditure are shown in Table 123.

S/27. Efforts will continue to be made - in close co-operation with other users of the VIC complex - to monitor carefully the costs of VIC maintenance and other operations. As the structure of the VIC buildings and facilities are now 10 years old, increases in maintenance and repair costs are expected.

S/28. No Agency manning table is given for this area of activity since all the personnel concerned are UNIDO or UN staff members.

Area of Activity S.4.2
Other General Services

S/29. The aim is to provide purchase 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 in VIC operating costs.

Summary of budget estimates by Area of Activity

Table 48

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
S.4.1 VIC Maintenance and Operation	5 503 000	-	-	5 503 000	24 000	0.4	5 527 000	4.0	5 723 000	4.0	5 978 000
S.4.2 Other General Services	4 478 000	(12 000)	(0.3)	4 466 000	76 000	1.7	4 542 000	4.7	4 678 000	5.2	5 003 000
Programme S.4. Total	9 981 000	(12 000)	(0.1)	9 969 000	100 000	1.0	10 069 000	4.3	10 401 000	4.6	10 981 000

Summary of main means by Area of Activity

Table 49

Area of Activity	1987/1988 Estimates (Regular Budget)										
	Man-years P	Man-years GS	Meetings	Database	Publishing	Inspecting	Standards, regulations	Research & development	Administrative support	Total	Responsible Division
S.4.1 VIC Maintenance and Operation	-	-	-	-	-	-	-	-	11 701 000	11 701 000	ADGS
S.4.2 Other General Services	20.0	142.0 52.0 M&O	-	-	-	-	-	-	9 681 000	9 681 000	ADGS
Programme S.4. Total	20.0	142.0 52.0 M&O	-	-	-	-	-	-	21 382 000	21 382 000	

PROGRAMME S.5

SPECIALIZED SERVICE ACTIVITIES

Area of Activity S.5.1
Public Information

S/30. The aim is to provide appropriate national organizations, public media and other bodies and persons that influence public opinion with factual, non-technical information on nuclear questions of a sensitive nature and on the Agency and its activities and hence to contribute to increased public acceptance of the use of nuclear energy for power generation and other purposes.

S/31. This objective will be achieved mainly through publications, contacts with the public and the press and the distribution of public information material.

S/32. The IAEA Bulletin will continue to be published four times a year and press releases will be issued on specific occasions. About 400 original pages of brochures and leaflets on selected topics will be produced annually. Lectures will be arranged for visiting groups, as will individual interviews and press briefings for journalists. TV and film teams will be assisted in their work. Also, some 2000 individual requests will be answered each year and video tape copies distributed. For specific occasions, exhibits will be organized.

S/33. In the period 1987-88, public information activities will highlight the following: the thirtieth anniversary of the IAEA, UNCPICPUNE, the conference on technical and economic performance of nuclear power, the twentieth anniversary of the NPT, the IRPA Congress on Radiation Protection in Australia and the American Association for the Advancement of Science Exhibit. In addition, information will be published on technology transfer and technical co-operation, and a safeguards presentation will be made in the United States.

Area of Activity S.5.2
International Nuclear Information System

S/34. Bibliographic data from INIS members will continue to be collected, converted to machine-readable form, coded by computer, copied and re-distributed to all Member States and participating international organizations twice a month. 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 is being reviewed and appropriate guidelines will be elaborated in co-operation with INIS Liasion Officers from Member States. Subject to the positive outcome of this review and of the guidelines it produces, on-line access will be provided to INIS members on request.

S/35. 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/36. 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/37. 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 NEA computer bank.

S/38. 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/39. Following the general review of INIS operations currently being carried out, it is expected that some changes in the methods of bibliographic description and of subject analysis of items reported to INIS will be made over a number of years.

S/40. Advanced software will be developed to enable quality control checks to be performed on 100% of the data reported to the system.

S/41. The Secretariat will assist Member States in using microcomputers for direct input from national INIS centres to the data base in Vienna as well as other local applications.

Area of Activity S.5.3
Radiation Protection Services

S/42. Personal 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/43. A personal 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/44. Radiation protection training will continue to be provided for Agency radiation workers (3-4 courses per year).

S/45. Two 8-week introductory courses on radiation protection practices are planned each year for 6-9 fellowship holders from Member States as part of TC 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/46. Advisory missions will be sent upon request to developing countries to assist them in the establishment or improvement of national radiation protection services.

S/47. A regional seminar on radiation protection services will be organized in 1988 for African countries.

Summary of budget estimates by Area of Activity

Table 50

Area of Activity / Programme		1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
S.5.1	Public Information	1 230 000	(74 000)	(6.0)	1 156 000	13 000	1.1	1 169 000	3.8	1 200 000	5.0	1 274 000
S.5.2	International Nuclear Information System	3 282 000	(100 000)	(3.0)	3 182 000	(21 000)	(0.7)	3 161 000	3.8	3 303 000	4.9	3 441 000
	Director's Office - NESI	152 000	(20 000)	(13.2)	132 000	-	-	132 000	3.8	137 000	5.1	144 000
S.5.3	Radiation Protection Services	410 000	-	-	410 000	37 000	9.0	447 000	2.9	422 000	5.0	483 000
Programme S.5. Total		5 074 000	(194 000)	(3.8)	4 880 000	29 000	0.6	4 909 000	3.7	5 062 000	4.9	5 342 000

Summary of main means by Area of Activity

Table 51

Area of Activity		1987/1988 Estimates (Regular Budget)										
		Man-years P	Man-years GS	Meetings	Database	Publishing	Standards, regulations	Research & development	TC support and advisory services	Administrative support	Total	Responsible Division
S.5.1	Public Information	10.0	16.0	-	-	2 474 000	-	-	-	-	2 474 000	ADPI
S.5.2	International Nuclear Information System	30.0	54.0	-	3 800 000	2 360 000	-	-	584 000	-	6 744 000	NESI
	Director's Office - NESI	2.0	4.0	-	-	-	-	-	-	281 000	281 000	NESI
S.5.3	Radiation Protection Services	6.2	10.6	-	-	-	-	-	300 000	605 000 a/	905 000	NENS
Programme S.5. Total		48.2	84.6	-	3 800 000	4 834 000	-	-	884 000	886 000	10 404 000	

a/ Laboratory services for Agency staff.

PROGRAMME S.6

SHARED SUPPORT SERVICES

Area of Activity S.6.1
Contract Administration Services

S/48. 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 1000 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
Conference Services and Interpretation

S/49. 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 (not including consultants' meetings) are serviced and some 2000 man-days of interpretation provided each year.

Area of Activity S.6.3
Translation and Records Services

S/50. 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/51. It is intended to cope with the growing volume of work by improving efficiency rather than by increasing numbers. The trend towards self-revision will be continued. A computerized terminology system was implemented in 1985 and a start will be made with the computerization of referencing during the coming year. The use of word processors will be extended to include translators. The results of computerized translation trials to be conducted in 1986 will be available early in 1987 and, if they are positive, the system will be extended to all language combinations as the software becomes available.

Area of Activity S.6.4
Medical Services

S/52. 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. A health promotion programme initiated in 1986 will be continued.

S/53. 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 ECGs are performed for the staff and experts of the VIC organizations.

Area of Activity S.6.5
Library

S/54. The aim is to give support to the programmes of the VIC organizations and to the Permanent Missions through the provision of a full range of library and information services.

S/55. Increasing emphasis will be placed on searches of external computerized bibliographic data bases to locate information in the published literature, which is growing at an annual rate of 8%. The use of computer searching enables an improved service to be provided with the same resources.

Area of Activity S.6.6
Data Processing Services

S/56. 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/57. Estimates by users indicate a 10% annual increase in computer utilization, which will result in the upgrading of the installed capacity. This has already happened with the computer used for safeguards work, which was replaced in 1985.

S/58. Efforts to reduce the backlog in the development of applications will be made by examining the increased use of software packages.

S/59. 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/60. The aim is to produce and distribute publications with a view to disseminating informatation 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.

Summary of budget estimates by Area of Activity

Table 52

Area of Activity / Programme	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
S.6.1 Contract Administration Services	361 000	24 000	6.6	385 000	12 000	3.1	397 000	3.4	398 000	4.3	428 000
S.6.2 Conference Services	487 000	(7 000)	(1.4)	480 000	6 000	1.3	486 000	3.3	496 000	5.8	531 000
and Interpretation	840 000	(114 000)	(13.6)	726 000	10 000	1.4	736 000	3.2	749 000	4.9	797 000
S.6.3 Translation and Records Services	4 205 000	(138 000)	(3.3)	4 067 000	(1 000)	-	4 066 000	3.1	4 193 000	5.2	4 408 000
S.6.4 Medical Services	755 000	(2 000)	(0.3)	753 000	-	-	753 000	4.0	783 000	5.1	824 000
S.6.5 Library a/	1 619 000	95 000	5.9	1 714 000	5 000	0.3	1 719 000	3.6	1 776 000	4.9	1 867 000
S.6.6 Data Processing Services	5 216 000	46 000	0.9	5 262 000	(27 000)	(0.5)	5 235 000	3.4	5 439 000	4.3	5 646 000
S.6.7 Printing and Publishing	5 684 000	(274 000)	(4.8)	5 410 000	33 000	0.6	5 443 000	4.5	5 655 000	5.0	5 976 000
Programme S.6. Total	19 167 000	(370 000)	(1.9)	18 797 000	38 000	0.2	18 835 000	3.7	19 489 000	4.9	20 477 000
Total: Programme S.6.									19 489 000		20 477 000
Less:											
cross-charge									659 000		700 000
charge to Agency meetings									749 000		797 000
Total: Shared Support Services									18 081 000		18 980 000
Allocated cost:											
to Agency programmes									13 677 000		14 339 000
to other organizations									3 425 000		3 613 000
									17 102 000		17 952 000
Non-allocated cost:											
Agency's share of the Library									979 000		1 028 000
Total: Shared Support Services									18 081 000		18 980 000

a/ All costs except those of the Library have been allocated to the user programmes. Contract Administration Services, Conference Services, Translation and Records Services, Data Processing Services and Printing and Publishing Services are shared by the user programmes. Interpretation is allocated to meetings; Medical Services are allocated to Personnel Services. Only the Library has not been allocated to any other programme and the cost is therefore shown under this programme.

Summary of main means by Area of Activity

Table 53

Area of Activity	Man-years P	Man-years GS	Meetings	Database	Publishing	Inspecting	Research & development	Administrative support	Services for other organizations	Total	Responsible Division
	1987/1988 Estimates (Regular Budget)										
S.6.1 Contract Administration Services	4.0	8.0	-	-	-	-	826 000	-	-	826 000	DDG RI
S.6.2 Conference Services	10.0	16.0	1 027 000	-	-	-	-	-	-	1 027 000	ADEX
and Interpretation	16.0	2.0	1 546 000	-	-	-	-	-	-	1 546 000	
S.6.3 Translation and Records Services	92.0	82.0 2.0 M&O	-	-	7 601 000	-	-	1 000 000	-	8 601 000	ADLA
S.6.4 Medical Services	6.0	30.0 6.0 M&O	-	-	-	-	-	753 000	854 000	1 607 000	ADPR
S.6.5 Library a/	10.0	20.0	-	-	2 007 000	-	-	-	1 636 000	3 643 000	NESI
S.6.6 Data Processing Services	62.0	60.0	-	5 000 000	-	-	-	4 033 000	2 052 000	11 085 000	NESI
S.6.7 Printing and Publishing	34.0	212.0 36.0 M&O	-	-	9 135 000	-	-	-	2 496 000	11 631 000	TCPU
Programme S.6. Total	234.0	430.0 44.0 M&O	2 573 000	5 000 000	18 743 000	-	826 000	5 786 000	7 038 000	39 966 000	

Total: Programme S.6.	39 966 000
Less:	
cross-charge	1 359 000
charge to Agency meetings	1 546 000
Total: Shared Support Services	37 061 000
Allocated cost:	
to Agency programmes	28 016 000
to other organizations	7 038 000
	35 054 000
Non-allocated cost:	
Agency's share of the Library	2 007 000
Total: Shared Support Services	37 061 000

a/ See footnote on Table 52

A N N E X E S I - III

A N N E X I

CONFERENCES, SYMPOSIA AND SEMINARS IN 1987

Within the limits of the appropriation and subject to the requirements of the individual programmes as outlined for 1987 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.	Conference on nuclear power performance and safety	A/70, A/102
2.	IAEA/NEA symposium on the back-end of the nuclear fuel cycle - strategies and options	B/55

NUCLEAR APPLICATIONS

3.	Symposium on dosimetry in radiotherapy	E/83
4.	FAO/IAEA symposium on changing perspectives in agrochemicals: isotopic techniques for the study of food and environmental implications	D/98
5.	Symposium on the utilization of multi-purpose research reactors and related international co-operation	G/48
6.	Symposium on isotope techniques in water resources development	F/23
7.	FAO/IAEA seminar on food irradiation for developing countries in Africa	D/109
8.	Seminar for Asia and the Pacific on calibration procedures in Secondary Standard Dosimetry Laboratories	E/83
9.	FAO/IAEA seminar for Latin America for improving the reproductive efficiency and health of livestock through radioimmunoassay and related techniques	D/45
10.	FAO/IAEA seminar on the improvement of basic food crops in Africa through plant breeding including the use of induced mutation	D/34
11.	Seminar for Latin America on the application of isotope techniques in hydrology	F/23
12.	Seminar on nuclear techniques in parasitic infections for developing countries in Africa	E/16

NUCLEAR SAFETY AND RADIATION PROTECTION

13.	Symposium on safety aspects of the ageing and maintenance of nuclear power plants	I/29
14.	Symposium on the implications of degraded core accidents for the design and licensing of nuclear power plants	I/29
15.	Seminar on operational safety experience in two-loop pressurized water reactors	I/90
16.	Seminar on the adoption, application and implementation of the Agency's regulations for the safe transport of radioactive materials	H/48
17.	Seminar on the application of computer technology to radiation protection	H/12

DIRECTION AND SUPPORT

18.	INIS training seminar	S/38

A N N E X I I

CONFERENCES, SYMPOSIA AND SEMINARS IN 1988

A list of scientific meetings considered by the Scientific Advisory Committee is presented for the second year of the biennium 1987-88. The reference following each meeting is to the relevant paragraph in the programme.

NUCLEAR POWER AND THE FUEL CYCLE

1.	Symposium on the management of low- and intermediate-level radioactive wastes	C/7
2.	Twelfth international conference on plasma physics and controlled nuclear fusion research	A/137
3.	Seminar on methods for the characterization and quality control of nuclear fuel and their feedback for improved fuel fabrication and behaviour	B/42

NUCLEAR APPLICATIONS

4.	FAO/IAEA symposium on modern insect control: nuclear techniques and biotechnology	D/83
5.	FAO/IAEA conference on acceptance, control of and trade in irradiated foods	D/114
6.	Symposium on applications of dynamic functional studies with radioisotopes in nuclear medicine in developing countries	E/30
7.	Seminar for Asia and the Pacific on nuclear techniques in parasitic and communicable diseases	E/16
8.	Seminar on training in nuclear medicine in developing countries	E/30
9.	Seminar on new approaches in practices and process technology for radiation sterilization of medical supplies	E/57
10.	Seminar for Latin America on industrial radiation applications	F/14

NUCLEAR SAFETY AND RADIATION PROTECTION

11.	Conference on radiation protection in nuclear energy	H/13
12.	Symposium on the feedback of operational safety experience from nuclear power plants	I/90
13.	Seminar on safety aspects of research reactors and critical assemblies	I/90

DIRECTION AND SUPPORT

14.	INIS training seminar for input preparation and output utilization	S/38
15.	Seminar on radiation protection services for developing countries in Africa	S/47

ANNEX III

Draft resolutions

A. REGULAR BUDGET APPROPRIATIONS FOR 1987

The General Conference,

Accepting the recommendations of the Board of Governors relating to the Regular Budget of the Agency for 1987 [1].

1. Appropriates on the basis of an exchange rate of AS 19.50 to $ 1.00, an amount of $ 103 899 000 for the Regular Budget expenses of the Agency in 1987 as follows:

		United States dollars
1.	Technical Assistance and Co-operation	5 207 000
2.	Nuclear Energy and Safety [2]	18 787 000
3.	Research and Isotopes [3]	14 424 000
4.	Operational Facilities [4]	2 363 000
5.	Safeguards	34 624 000
6.	Policy-making Organs	3 809 000
7.	Executive Management and Administration [5]	10 859 000
8.	General Services	10 401 000
9.	Shared Support Services	3 425 000
	(Cost of Work for Others)	
	TOTAL	103 899 000

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 $ 4 565 000 (representing $ 1 165 000 plus AS 66 300 000), from contributions by Member States amounting, for an

exchange rate of AS 19.50 to $ 1.00, to $ 95 909 000 ($ 24 601 000 plus the equivalent in US dollars of AS 1 390 506 000), in accordance with the scale of assessment fixed by the General Conference in resolution GC(XXX)/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 1987, 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 1987; and

(b) With the prior approval of the Board of Governors, to make transfers between any of the Sections listed in paragraph 1 above.

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[1] See document GC(XXX)/
[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 Research and Laboratories.
[4] For the financing of the International Centre for Theoretical Physics (in part) and the International Laboratory of Marine Radioactivity (in part).
[5] For the financing of Executive Management and Administration.

ATTACHMENT

ADJUSTMENT FORMULA IN US $

1.	Technical Assistance and Co-operation	856 000	+	(84 840 000 / R)
2.	Nuclear Energy and Safety [2]	5 157 000	+	(265 782 000 / R)
3.	Research and Isotopes [3]	4 838 000	+	(186 927 000 / R)
4.	Operational Facilities [4]	1 319 000	+	(20 366 000 / R)
5.	Safeguards	9 915 000	+	(481 822 000 / R)
6.	Policy-making Organs	595 000	+	(62 670 000 / R)
7.	Executive Management and Administration [5]	2 116 000	+	(170 492 000 / R)
8.	General Services	970 000	+	(183 907 000 / R)
9.	Shared Support Services (Cost of Work for Others)	719 000	+	(52 767 000 / R)
	TOTAL	26 485 000	+	(1 509 573 000 / R)

Note: R is the average United Nations schilling-to-dollar exchange rate which will be experienced during 1987.

B. TECHNICAL ASSISTANCE AND CO-OPERATION FUND ALLOCATION FOR 1987

The General Conference,

Accepting the recommendations of the Board of Governors relating to the Agency's technical assistance and co-operation programme for 1987;

1. Decides that for 1987 the target for voluntary contributions to the Technical Assistance and Co-operation Fund shall be $34 000 000;

2. Notes that funds from other sources, estimated at $1 million, are expected to be available for that programme;

3. Allocates the amount of $35 000 000 for the Agency's technical assistance and co-operation programme for 1987; and

4. Urges all Member States to make voluntary contributions for 1987 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 1987

The General Conference,

Accepting the recommendations of the Board of Governors relating to the Agency's Working Capital Fund in 1987 [1],

1. Approves a level of $2 million for the Agency's Working Capital Fund in 1987;

2. Decides that the Fund shall be financed, administered and used in 1987 in accordance with the relevant provisions of the Agency's Financial Regulations [2];

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.

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[1] See document GC(XXX) para of the Introduction.
[2] INFCIRC/8/Rev.1 and Mod.1.

P A R T II

M A N A G E M E N T P L A N

THE REGULAR BUDGET

By appropriation section

Table 54

	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
1. Technical Assistance and Co-operation	4 471 278	5 022 000	14 000	0.3	5 036 000	75 000	1.5	5 111 000	3.4	5 207 000	5.0	5 549 000
2. Nuclear Power	2 960 220	3 122 000	293 000	9.4	3 415 000	(65 000)	(1.9)	3 350 000	3.1	3 521 000	5.0	3 626 000
Nuclear Fuel Cycle	2 919 890	3 173 000	127 000	4.0	3 300 000	202 000	6.1	3 502 000	3.1	3 402 000	4.7	3 781 000
Nuclear Safety	5 205 961	5 411 000	1 256 000	23.2	6 667 000	359 000	5.4	7 026 000	3.3	6 887 000	4.7	7 598 000
Scientific and Technical Information	4 465 233	4 759 000	36 000	0.8	4 795 000	13 000	0.3	4 808 000	3.8	4 977 000	4.9	5 236 000
Nuclear Energy and Safety	15 551 304	16 465 000	1 712 000	10.4	18 177 000	509 000	2.8	18 686 000	3.4	18 787 000	4.8	20 241 000
3. Food and Agriculture	5 048 154	5 102 000	23 000	0.5	5 125 000	52 000	1.0	5 177 000	3.7	5 317 000	4.9	5 634 000
Life Sciences	2 921 175	3 001 000	214 000	7.1	3 215 000	3 000	0.1	3 218 000	3.5	3 328 000	4.7	3 488 000
Research and Laboratories	5 342 473	5 517 000	66 000	1.2	5 583 000	36 000	0.6	5 619 000	3.5	5 779 000	4.8	6 093 000
Research and Isotopes	13 311 802	13 620 000	303 000	2.2	13 923 000	91 000	0.7	14 014 000	3.6	14 424 000	4.8	15 215 000
4. International Centre for Theoretical Physics	1 105 194	1 170 000	-	-	1 170 000	-	-	1 170 000	3.2	1 207 000	3.4	1 248 000
International Laboratory of Marine Radioactivity	1 056 629	1 120 000	(3 000)	(0.3)	1 117 000	11 000	1.0	1 128 000	3.5	1 156 000	4.9	1 225 000
Operational Facilities	2 161 823	2 290 000	(3 000)	(0.1)	2 287 000	11 000	0.5	2 298 000	3.3	2 363 000	4.2	2 473 000
5. Safeguards	30 987 472	33 622 000	(101 000)	(0.3)	33 521 000	332 000	1.0	33 853 000	3.3	34 624 000	4.8	36 657 000
6. Policy-making Organs	2 935 573	3 726 000	(45 000)	(1.2)	3 681 000	20 000	0.5	3 701 000	3.5	3 809 000	5.0	4 021 000
7. Executive Management	1 681 561	1 870 000	(50 000)	(2.7)	1 820 000	1 000	0.1	1 821 000	2.9	1 873 000	4.9	1 966 000
Administration	7 825 442	8 380 000	300 000	3.6	8 680 000	104 000	1.2	8 784 000	3.5	8 986 000	5.0	9 543 000
Executive Management and Administration	9 507 003	10 250 000	250 000	2.4	10 500 000	105 000	1.0	10 605 000	3.4	10 859 000	5.0	11 509 000
8. General Services	9 793 470	9 981 000	(12 000)	(0.1)	9 969 000	100 000	1.0	10 069 000	4.3	10 401 000	4.6	10 981 000
9. Shared Support Services (Cost of work for others)	3 786 975	3 704 000	(409 000)	(11.0)	3 295 000	24 000	0.7	3 319 000	3.9	3 425 000	4.8	3 613 000
TOTAL	92 506 700	98 680 000	1 709 000	1.7	100 389 000	1 267 000	1.3	101 656 000	3.5	103 899 000	4.8	110 259 000

The Regular Budget

By Appropriation Section

Table 55

	1986 Budget	Adjustments a/	1986 Adjusted	Expenditure increase	(decrease) %	1987 at 1986 prices	Expenditure increase	(decrease) %	1988 at 1986 prices
1. Technical Assistance and Co-operation	5 022 000	(20 000)	5 002 000	34 000	0.7	5 036 000	75 000	1.5	5 111 000
2. Nuclear Energy and Safety	16 465 000	(58 000)	16 407 000	1 770 000	10.8	18 177 000	509 000	2.8	18 686 000
3. Research and Isotopes	13 620 000	(45 000)	13 575 000	348 000	2.6	13 923 000	91 000	0.7	14 014 000
4. Operational Facilities	2 290 000	(3 000)	2 287 000	-	-	2 287 000	11 000	0.5	2 298 000
5. Safeguards	33 622 000	(101 000)	33 521 000	-	-	33 521 000	332 000	1.0	33 853 000
6. Policy-making Organs	3 726 000	(11 000)	3 715 000	(34 000)	(0.9)	3 681 000	20 000	0.5	3 701 000
7. Executive Management and Administration	10 250 000	250 000	10 500 000	-	-	10 500 000	105 000	1.0	10 605 000
8. General Services	9 981 000	(12 000)	9 969 000	-	-	9 969 000	100 000	1.0	10 069 000
Sub-Total	94 976 000	-	94 976 000	2 118 000	2.2	97 094 000	1 243 000	1.3	98 337 000
9. Cost of work for others	3 704 000	-	3 704 000	(409 000)	(11.0)	3 295 000	24 000	0.7	3 319 000
T O T A L	98 680 000	-	98 680 000	1 709 000	1.7	100 389 000	1 267 000	1.3	101 656 000

a/ In order to provide better control over some items which had previously been included in Common Staff Costs and in Shared Support Services, these items are transferred to Personnel (Appropriation Section 7, Executive Management and Administration) in the 1987 estimates. The 1986 estimates (as shown in GC(XXIX)/750) have been adjusted in this table in order to make them comparable with the 1987 estimates (see also paragraph 80 of the Introduction).

Note: In the detailed tables by Appropriation Section the 1986 column is not adjusted but the original figures are used as summarized in Table 54.

THE REGULAR BUDGET

By Department

Table 56

	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
1. Director General and Secretariat of the Policy-making Organs	3 641 988	4 538 000	(46 000)	(1.0)	4 492 000	23 000	0.5	4 515 000	3.4	4 645 000	5.0	4 901 000
2. Department of Technical Co-operation	4 689 978	5 249 000	(2 000)	-	5 247 000	74 000	1.4	5 321 000	3.4	5 424 000	5.0	5 776 000
3. Department of Nuclear Energy and Safety	15 788 005	16 729 000	1 706 000	10.2	18 435 000	508 000	2.8	18 943 000	3.3	19 052 000	4.9	20 519 000
4. Department of Research and Isotopes	15 730 563	16 185 000	287 000	1.8	16 472 000	102 000	0.6	16 574 000	3.6	17 057 000	4.7	17 970 000
5. Department of Safeguards	30 987 472	33 622 000	(101 000)	(0.3)	33 521 000	332 000	1.0	33 853 000	3.3	34 624 000	4.8	36 657 000
6. Department of Administration	17 881 719	18 653 000	274 000	1.5	18 927 000	204 000	1.1	19 131 000	3.9	19 672 000	4.8	20 823 000
Total Agency Programmes	88 719 725	94 976 000	2 118 000	2.2	97 094 000	1 243 000	1.3	98 337 000	3.5	100 474 000	4.8	106 646 000
7. Shared Support Services including cost of work for others	17 310 747	17 836 000	(404 000)	(2.3)	17 432 000	18 000	0.1	17 450 000	3.7	18 081 000	4.9	18 980 000
Less: Amount of services charged to Agency programmes	13 523 772	14 132 000	5 000	-	14 137 000	(6 000)	-	14 131 000	3.7	14 656 000	4.9	15 367 000
Cost of work for others	3 786 975	3 704 000	(409 000)	(11.0)	3 295 000	24 000	0.7	3 319 000	3.9	3 425 000	4.8	3 613 000
Total Regular Budget	92 506 700	98 680 000	1 709 000	1.7	100 389 000	1 267 000	1.3	101 656 000	3.5	103 899 000	4.8	110 259 000

THE REGULAR BUDGET

By item of expenditure

Table 57

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	33 648 737	36 843 000	385 000	1.0	37 228 000	224 000	0.6	37 452 000	3.0	38 361 000	5.2	40 582 000
Consultants	1 325 785	1 104 400	125 500	11.4	1 229 900	58 500	4.8	1 288 400	6.5	1 309 900	6.5	1 461 300
Overtime	133 127	131 400	(7 400)	(5.6)	124 000	1 300	1.0	125 300	5.0	130 400	5.0	138 100
Temporary assistance	938 072	439 200	(25 800)	(5.9)	413 400	1 200	0.3	414 600	5.0	434 800	5.0	457 000
Common staff costs	12 786 522	13 998 700	(36 000)	(0.3)	13 962 700	82 000	0.6	14 044 700	3.0	14 386 500	5.2	15 219 900
Equipment	4 413 149	4 375 600	(422 600)	(9.7)	3 953 000	(404 100)	(10.2)	3 548 900	4.0	4 111 000	4.0	3 838 700
Supplies	2 627 478	2 275 700	(3 700)	(0.2)	2 272 000	161 800	7.1	2 433 800	4.0	2 362 300	4.0	2 632 400
Scientific and technical contracts	3 496 522	3 552 000	292 000	8.2	3 844 000	128 000	3.3	3 972 000	4.1	4 002 000	4.1	4 304 000
Training	268 505	440 300	168 900	38.4	609 200	6 000	1.0	615 200	3.0	627 400	3.0	652 600
Conferences, symposia, seminars	745 651	1 033 000	55 000	5.3	1 088 000	86 000	7.9	1 174 000	2.3	1 116 000	2.3	1 239 000
Technical committees, advisory groups	1 183 614	1 728 000	(86 000)	(5.0)	1 642 000	(54 000)	(3.3)	1 588 000	2.3	1 679 000	2.3	1 661 000
Hospitality	79 577	95 500	3 900	4.1	99 400	3 700	3.7	103 100	-	99 400	-	103 100
Representation allowance	29 894	30 000	-	-	30 000	-	-	30 000	-	30 000	-	30 000
Travel	3 827 963	4 600 700	(261 400)	(5.7)	4 339 300	90 700	2.1	4 430 000	4.7	4 543 400	4.7	4 856 100
Common services	8 601 532	8 646 600	218 500	2.5	8 865 100	162 500	1.8	9 027 600	5.0	9 257 800	5.0	9 847 600
Other b/	1 089 825	1 549 900	1 707 100	110.1	3 257 000	701 400	21.5	3 958 400	3.4	3 367 100	4.0	4 256 200
Sub-total: Direct costs	75 195 953	80 844 000	2 113 000	2.6	82 957 000	1 249 000	1.5	84 206 000	3.4	85 818 000	4.8	91 279 000
Contract administration services	318 651	361 000	24 000	6.6	385 000	12 000	3.1	397 000	3.4	398 000	4.3	428 000
Conference services	469 439	487 000	(7 000)	(1.4)	480 000	6 000	1.3	486 000	3.3	496 000	5.8	531 000
Translation and records services	3 637 703	4 170 000	(142 000)	(3.4)	4 028 000	(1 000)	-	4 027 000	3.1	4 153 000	5.2	4 366 000
Medical services	304 478	355 000	(2 000)	(0.6)	353 000	-	-	353 000	4.0	367 000	5.1	386 000
Library	847 711	891 000	54 000	6.1	945 000	1 000	0.1	946 000	3.6	979 000	4.9	1 028 000
Data processing services	4 076 471	3 721 000	53 000	1.4	3 774 000	(49 000)	(1.3)	3 725 000	3.4	3 901 000	4.3	4 018 000
Printing and publishing services	3 869 319	4 147 000	25 000	0.6	4 172 000	25 000	0.6	4 197 000	4.6	4 362 000	5.0	4 610 000
Sub-total: Shared costs	13 523 772	14 132 000	5 000	-	14 137 000	(6 000)	-	14 131 000	3.7	14 656 000	4.9	15 367 000
Agency Programmes	88 719 725	94 976 000	2 118 000	2.2	97 094 000	1 243 000	1.3	98 337 000	3.5	100 474 000	4.8	106 646 000
Cost of work for others	3 786 975	3 704 000	(409 000)	(11.0)	3 295 000	24 000	0.7	3 319 000	3.9	3 425 000	4.8	3 613 000
Total Regular Budget	92 506 700	98 680 000	1 709 000	1.7	100 389 000	1 267 000	1.3	101 656 000	3.5	103 899 000	4.8	110 259 000

a/ percentages as applied at the Area of Activity level

b/ includes the estimates for SNSP for 1987 and 1988

Table 57 shows the Regular Budget by item of expenditure. Explanations for the main increases or decreases in expenditure are given below.

- The expenditure increase in Salaries for established posts ($ 385 000) is due to the addition of Manning Table posts for which an explanation is provided in the text following Table 61. Despite an increase in the salary figure there is a decrease in Common staff costs ($ 36 000) since the percentage of common staff costs will be reduced from 38 % of salaries in 1986 to 37.5 % in 1987, as explained in the Introduction.

- As a result of the regularization of 27 GS posts, Temporary assistance requirements have been reduced. Since actual requirements for temporary assistance in 1985 were much higher than the amount foreseen in the 1986 budget, the reduction compared with the 1986 budget estimates is only $ 25 800. The increase in Consultants services ($ 125 500) relates to all areas: actual utilization in 1985 confirms this need.

- The expenditure reduction under Equipment ($ 422 600) is the net result of a larger reduction under Safeguards and some increases in other areas. The increase in Scientific and technical contracts ($ 133 000) is mainly related to Safeguards.

- The increase in Training ($ 168 900) is attributable to the transfer of the cost of language training from common staff costs to "training" in Executive Management and Administration, as explained in the Introduction.

- The increase under Conference, symposia, seminars ($ 55 000) as well as a small increase in hospitality funds are required for a large conference in the nuclear power and fuel cycle area and are more than offset by a decrease ($ 86 000) in respect of Technical committees and advisory groups.

- The expenditure decrease in Travel ($ 261 400) represents Safeguards inspection travel.

- The increase in Common services ($ 218 500) is attributable to many areas. To a large extent it represents rental and maintenance of the dedicated data processing equipment used in all areas. It is more than offset by a decrease under Other ($ 251 900).

- In Shared Support Services, which are charged to the Agency's programmes, increases and decreases offset each other. The largest decrease ($ 142 000) is in respect of Translation and records services where measures have been taken to reduce the costs of the services.

- Cost of work for others - which is matched by corresponding income - shows a decrease of $ 409 000 which represents a reduction in the contributions made by other organizations to the shared services (see Introduction). Details of Shared Support Services are presented in Table 58 which shows that the decrease in work for others is met by reductions in salaries, common staff costs, temporary assistance and equipment.

Shared Support Services

Table 58

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	8 132 165	9 070 400	(323 400)	(3.6)	8 747 000	84 000	1.0	8 831 000	3.5	9 054 000	5.3	9 628 000
Consultants	239	7 300	2 700	37.0	10 000	-	-	10 000	6.5	10 600	6.5	11 400
Overtime	119 335	33 100	600	1.8	33 700	-	-	33 700	5.0	35 400	5.0	37 200
Temporary assistance	619 113	920 100	(113 400)	(12.3)	806 700	(26 000)	(3.2)	780 700	5.0	847 200	5.0	860 700
Common staff costs	2 987 992	3 445 800	(165 000)	(4.8)	3 280 800	31 000	0.9	3 311 800	3.5	3 398 500	5.3	3 613 400
Equipment	1 839 454	930 200	(41 600)	(4.5)	888 600	(337 000)	(37.9)	551 600	4.0	924 200	4.0	596 700
Supplies	1 786 991	1 707 200	(50 300)	(2.9)	1 656 900	113 700	6.9	1 770 600	4.0	1 723 200	4.0	1 915 200
Scientific and technical contracts	294 983	216 800	(5 800)	(2.7)	211 000	-	-	211 000	4.1	220 000	4.1	228 000
Training	62 588	62 400	1 900	3.0	64 300	-	-	64 300	3.0	66 300	3.0	68 200
Hospitality	366	1 700	-	-	1 700	-	-	1 700	-	1 700	-	1 700
Travel	32 741	39 900	(4 400)	(11.0)	35 500	-	-	35 500	4.7	37 100	4.7	39 000
Common services	2 035 822	2 204 600	217 200	9.9	2 421 800	147 000	6.1	2 568 800	3.7	2 511 800	3.7	2 761 300
Other	-	36 500	(36 500)	(100.0)	-	15 300	-	15 300	3.0	-	3.0	16 200
Sub-total: Direct costs	17 911 789	18 676 000	(518 000)	(2.8)	18 158 000	28 000	0.2	18 186 000	3.7	18 830 000	4.9	19 777 000
Translation and records services	47 210	35 000	4 000	11.4	39 000	-	-	39 000	3.1	40 000	5.2	42 000
Data processing services	339 663	394 000	128 000	32.5	522 000	12 000	2.3	534 000	3.4	539 000	4.3	575 000
Printing and publishing services	60 529	62 000	16 000	25.8	78 000	(2 000)	(2.6)	76 000	4.6	80 000	5.0	83 000
Sub-total: Shared costs	447 402	491 000	148 000	30.1	639 000	10 000	1.6	649 000	3.1	659 000	4.6	700 000
SUB-TOTAL	18 359 191	19 167 000	(370 000)	(1.9)	18 797 000	38 000	0.2	18 835 000	3.7	19 489 000	4.8	20 477 000
Less: Cross-Charge (above)	447 402	491 000	148 000	30.1	639 000	10 000	1.6	649 000	3.1	659 000	4.6	700 000
Charge to Agency meetings	601 042	840 000	(114 000)	(13.6)	726 000	10 000	1.4	736 000	3.2	749 000	4.9	797 000
Total Shared Support Services	17 310 747	17 836 000	(404 000)	(2.3)	17 432 000	18 000	0.1	17 450 000	3.7	18 081 000	4.9	18 980 000
Cost of work for others	3 786 975	3 704 000	(409 000)	(11.0)	3 295 000	24 000	0.7	3 319 000	3.9	3 425 000	4.8	3 613 000
Total paid by Agency under Shared Support Services	13 523 772	14 132 000	5 000	-	14 137 000	(6 000)	-	14 131 000	3.7	14 656 000	4.9	15 367 000

a/ percentages as applied at the Area of Activity level

Manning Table for 1987

Table 59

	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	-	1	-	5	4	-	9
Secretariat of the Policy-making Organs	-	-	1	1	-	1	-	-	3	2	-	5
Sub-total	1	-	2	2	1	1	1	-	8	6	-	14
Department of Technical Co-operation [a]	-	1	-	-	-	-	1	-	2	2	-	4
Division of Technical Assistance and Co-operation	-	-	1	10	10	15	4	1	41	62	-	103
Sub-total	-	1	1	10	10	15	5	1	43	64	-	107
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	13	1	-	-	22	13	-	35
Division of Nuclear Safety	-	-	1	15	12	3	-	-	31	24	-	55
Division of Scientific and Technical Information [b]	-	-	1	3	5	9	-	-	18	33	-	51
Sub-total	-	1	4	35	36	19	1	1	97	85	-	182
Department of Research and Isotopes	-	1	-	1	-	1	-	-	3	3	-	6
Division of Food and Agriculture [c]	-	-	-	6	6	3	2	-	17	8	-	25
Division of Life Sciences	-	-	1	4	8	2	-	-	15	10	-	25
Division of Research and Laboratories	-	-	1	7	11	5	3	-	27	18	-	45
The Agency's Laboratory	-	-	1	3	10	7	6	1	28	57	25	110
International Laboratory of Marine Radioactivity	-	-	1	1	2	1	3	1	9	15	-	24
International Centre for Theoretical Physics	-	-	1	6	2	1	1	-	11	25	-	36
Sub-total	-	1	5	28	39	20	15	2	110	136	25	271
Department of Safeguards	-	1	-	-	-	-	-	-	1	2	-	3
Division of Operations A	-	-	1	13	23	34	-	-	71	31	-	102
Division of Operations B	-	-	1	11	18	19	-	-	49	27	-	76
Division of Operations C	-	-	1	10	27	24	-	-	62	37	-	99
Division of Development [d]	-	-	1	11	19	2	-	-	33	31	-	64
Division of Information Treatment [e]	-	-	1	2	12	4	2	8	29	36	-	65
Division of Evaluation [f]	-	-	1	5	13	2	-	-	21	15	-	36
Division of Standardization [g]	-	-	1	4	5	1	1	-	12	14	-	26
Sub-total	-	1	7	56	117	86	3	8	278	193	-	471
Department of Administration	-	1	-	1	-	1	-	-	3	2	-	5
Office of Internal Audit and Management	-	-	-	1	3	2	1	-	7	6	-	13
Division of Budget and Finance	-	-	1	4	5	6	5	-	21	44	-	65
Division of General Services	-	-	1	2	2	2	2	1	10	71	26	107
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	24	-	36
Sub-total	-	1	7	17	18	18	12	1	74	172	26	272
Shared Support Services												
Contract Administration Services	-	-	1	-	1	-	-	-	2	4	-	6
Conference Services	-	-	-	1	-	1	3	-	5	8	-	13
Translation and Records Services	-	-	1	6	14	25	-	-	46	41	1	88
Interpretation	-	-	-	1	4	3	-	-	8	1	-	9
Medical Services	-	-	1	-	2	-	-	-	3	15	3	21
Library	-	-	-	1	-	1	2	1	5	10	-	15
Data Processing Services	-	-	-	3	9	10	6	3	31	30	-	61
Printing and Publishing Services	-	-	1	2	-	5	9	-	17	106	18	141
Sub-total	-	-	4	14	30	45	20	4	117	215	22	354
TOTAL	1	5	30	162	251	204	57	17	727	871	73	1671

Note: Does not include possible additional manpower for the SNSP.

[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 Data Processing Services and Library which are shown under Shared Support Services.

Full titles of the respective Divisions are:

[c] Joint FAO/IAEA Division of Isotope and Radiation Applications of Atomic Energy for Food and Agricultural Development

[d] Division of Development and Technical Support

[e] Division of Safeguards Information Treatment

[f] Division of Safeguards Evaluation

[g] Division of Standardization, Training and Administrative Support

Summary of manpower by grade of post and by Department

Table 60

Grade of post	Number of established posts						
				Change			
	1985 Adjusted	1986	1986 Adjusted	New posts	Reclassifications	1987	1988
DG	1	1	1	-	-	1	1
DDG	5	5	5	-	-	5	5
D	29	30	30	-	-	30	30
P-5	152	161	161	1	-	162	162
P-4	243	251	251	-	-	251	251
P-3	195	197	197	7	-	204	204
P-2	57	57	57	-	-	57	57
P-1	19	19	19	(2)	-	17	17
Sub-total	701	721	721	6	-	727	727
GS	810	836	836	35	-	871	871
M&O	75	73	73	-	-	73	73
TOTAL	1586	1630	1630	41	-	1671	1671

				Change				
				P	GS	M&O		
Department:								
Office of the Director General	14	14	14	-	-	-	14	14
Department of Technical Co-operation	90	98	98	-	9	-	107	107
Department of Nuclear Energy and Safety	175	176	177	-	5	-	182	182
Department of Research and Isotopes	261	266	266	2	3	-	271	271
Department of Safeguards	435	455	455	6	10	-	471	471
Department of Administration	264	268	270	-	2	-	272	272
Shared Support Services (Agency posts)	347	353	350	(2)	6	-	354	354
TOTAL	1586	1630	1630	6	35	-	1671	1671
Extrabudgetary posts:								
Common printing services	9	9	9	-	-	-	9	9
Library	14	14	14	-	-	-	14	14
TOTAL	23	23	23	-	-	-	23	23

Note: A detailed review of the 1988 posts has not yet been made.
Note: Does not include possible additional manpower for the SNSP.

New posts for 1987

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	-	-	-	-	-	-	-	-	-	9	-	9
Sub-total	-	-	-	-	-	-	-	-	-	9	-	9
Department of Nuclear Energy and Safety												
Division of Nuclear Power	-	-	-	-	-	-	-	-	-	1	-	1
Division of Nuclear Safety	-	-	-	-	-	-	-	-	-	1	-	1
Division of Scientific and Technical Information [b]	-	-	-	-	-	-	-	-	-	3	-	3
Sub-total	-	-	-	-	-	-	-	-	-	5	-	5
Department of Research and Isotopes												
Division of Food and Agriculture [c]	-	-	-	-	-	1	-	-	1	-	-	1
The Agency's Laboratory	-	-	-	-	-	-	-	-	-	1	-	1
International Centre for Theoretical Physics	-	-	-	1	-	-	-	-	1	2	-	3
Sub-total	-	-	-	1	-	1	-	-	2	3	-	5
Department of Safeguards												
Division of Operations A	-	-	-	-	-	2	-	-	2	(1)	-	1
Division of Operations B	-	-	-	-	-	2	-	-	2	1	-	3
Division of Operations C	-	-	-	-	-	1	-	-	1	4	-	5
Division of Development [d]	-	-	-	-	-	-	-	-	-	2	-	2
Division of Information Treatment [e]	-	-	-	-	-	1	-	-	1	2	-	3
Division of Evaluation [f]	-	-	-	-	-	-	-	-	-	1	-	1
Division of Standardization [g]	-	-	-	-	-	-	-	-	-	1	-	1
Sub-total	-	-	-	-	-	6	-	-	6	10	-	16
Department of Administration												
Office of Internal Audit and Management	-	-	-	-	-	-	-	-	-	1	-	1
Division of Budget and Finance	-	-	-	-	-	-	-	-	-	1	-	1
Sub-total	-	-	-	-	-	-	-	-	-	2	-	2
Shared Support Services												
Conference Services	-	-	-	-	-	-	-	-	-	1	-	1
Medical Services	-	-	-	-	-	-	-	-	-	2	-	2
Data Processing Services	-	-	-	-	-	-	-	(2)	(2)	3	-	1
Sub-total	-	-	-	-	-	-	-	(2)	(2)	6	-	4
TOTAL	-	-	-	1	-	7	-	(2)	6	35	-	41

Note: Does not include possible additional manpower for the SNSP.

[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 Data Processing Services and Library which are shown under Shared Support Services.

Full titles of the respective Divisions are:

[c] Joint FAO/IAEA Division of Isotope and Radiation Applications of Atomic Energy for Food and Agricultural Development

[d] Division of Development and Technical Support

[e] Division of Safeguards Information Treatment

[f] Division of Safeguards Evaluation

[g] Division of Standardization, Training and Administrative Support

ADDITIONAL PROFESSIONAL POSTS IN 1987

Department of Research and Isotopes

Division of Food and Agriculture (1 P-3)

In line with growing worldwide interest in food irradiation, an increasing number of requests for advisory services and technical co-operation projects has been received. An additional Professional officer is required to meet the expansion in workload that this has entailed.

International Centre for Theoretical Physics (1 P-5)

One P-5 scientific officer is required to add to the nucleus of permanent scientific staff of the Centre. The Agency's overall contribution to the Centre will not be affected.

Department of Safeguards

Division of Operations A, B and C (5 P-3)

Five additional P-3 inspectors are required to increase the inspection effort of the Department (nine inspection assistant posts are relinquished as mentioned below under "Additional General Service Posts in 1987").

Division of Safeguards Information Treatment (1 P-3)

An additional systems analyst is required to develop information systems, in particular for applications of computers in the field.

	8
Two P-1 posts are relinquished in exchange for two GS posts (see below) in the Department of Nuclear Energy and Safety	-2
TOTAL	6

ADDITIONAL GENERAL SERVICE POSTS IN 1987

Department of Technical Co-operation (1 GS)

An additional post is required in the Programme Co-ordination Section to carry out work that has been regularly performed by temporary assistance.

Division of Technical Assistance and Co-operation

One additional GS post is required in the Director's Office to cope with the increased workload. (1 GS)

Three additional posts are required for Area Offices to cope with the increase in workload: one for the Asia and the Pacific Section, one for the Middle East and Europe Section (for work previously performed by temporary assistance) and one for the Latin America Section. (3 GS)

One additional post is required for the Training Courses Section. (1 GS)

Two additional psts are required for the Experts Section and one for the Field Procurement Section, all for work which has been done so far by temporary assistance and which, owing to the expansion in technical co-operation activities, will continue to be needed in the future. (3 GS)

Department of Nuclear Energy and Safety

Division of Nuclear Power (1 GS)

An additional secretarial post is required in the Economic Studies Section to carry out work which has been performed to date with the help of temporary assistance.

Division of Nuclear Safety (1 GS)

An additional clerical post is required in the Safety of Nuclear Installations Section for work which has been carried out by temporary assistance staff.

Division of Scientific and Technical Information

One additional post is required in the INIS Section for a documentation clerk/secretary. (1 GS)

Two posts are required for work so far performed with the help of temporary assistance, one in the Scientific Journals Unit, and the other in the INIS Section. (2 GS)

(For Computer Section posts, see Shared Support Services.)

Department of Research and Isotopes

The Agency's Laboratory (1 GS)

One additional post is required for a technician at Safeguards Analytical Laboratory (SAL). The costs of SAL are charged to the safeguards programme.

International Centre for Theoretical Physics (2 GS)

Two posts are required to carry out tasks which have so far been performed with the help of temporary assistance.

Department of Safeguards

Division of Operations A, B and C (4 GS)

Nine posts are required for data clerks: six posts are for work which has been carried out by temporary assistance staff while three new posts are needed as a result of increased inspection activities. Four posts are required for secretarial work, all of which is currently performed through temporary assistance.

Nine inspection assistant posts will be relinquished.

Division of Development and Technical Support

Two technicians are required to maintain the increasing inventory of safeguards equipment. (2 GS)

Division of Safeguards Information Treatment (2 GS)

One production programmer is needed to assist in the maintenance of the ISIS system. One secretarial post is required for work currently performed by temporary assistance staff.

Division of Safeguards Evaluation (1 GS)

One post is required for an evaluation clerk.

Division of Standardization, Training and Administrative Support (1 GS)

A secretarial post is required for the Section for Administrative Support. The work in question is currently performed by temporary assistance staff.

Department of Administration

Office of Internal Audit and Management (1 GS)

One additional clerk/typist post is required to carry out work so far performed with the help of temporary assistance.

Division of Budget and Finance (1 GS)

One post is required in the Control Section for work which has been carried out by temporary assistance.

Shared Support Services

Conference Services (1 GS)

One clerk/secretary post is required for work which has been performed by temporary assistance.

Medical Services (2 GS)

Two clerical posts are required to perform work which so far has been carried out by temporary assistance.

Data Processing Services (3 GS)

Three posts are required to carry out work which has so far been performed by staff charged to two Professional posts and by temporary staff.

Two P-1 posts are relinquished.

(See "Additional Professional Posts in 1987" and Table 61).

TOTAL	35

Adjusted Manning Table for 1986

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	-	1	-	5	4	-	9
Secretariat of the Policy-making Organs	-	-	1	1	-	1	-	-	3	2	-	5
Sub-total	1	-	2	2	1	1	1	-	8	6	-	14
Department of Technical Co-operation a/	-	1	-	-	-	-	1	-	2	2	-	4
Division of Technical Assistance and Co-operation	-	-	1	10	10	15	4	1	41	53	-	94
Sub-total	-	1	1	10	10	15	5	1	43	55	-	98
Department of Nuclear Energy and Safety	-	1	-	-	-	1	-	1	3	2	-	5
Division of Nuclear Power	-	-	1	10	6	5	1	-	23	12	-	35
Division of Nuclear Fuel Cycle	-	-	1	7	13	1	-	-	22	13	-	35
Division of Nuclear Safety	-	-	1	15	12	3	-	-	31	23	-	54
Division of Scientific and Technical Information b/	-	-	1	3	5	9	-	-	18	30	-	48
Sub-total	-	1	4	35	36	19	1	1	97	80	-	177
Department of Research and Isotopes	-	1	-	1	-	1	-	-	3	3	-	6
Division of Food and Agriculture c/	-	-	-	6	6	2	2	-	16	8	-	24
Division of Life Sciences	-	-	1	4	8	2	-	-	15	10	-	25
Division of Research and Laboratories	-	-	1	7	11	5	3	-	27	18	-	45
The Agency's Laboratory	-	-	1	3	10	7	6	1	28	56	25	109
International Laboratory of Marine Radioactivity	-	-	1	1	2	1	3	1	9	15	-	24
International Centre for Theoretical Physics	-	-	1	5	2	1	1	-	10	23	-	33
Sub-total	-	1	5	27	39	19	15	2	108	133	25	266
Department of Safeguards	-	1	-	-	-	-	-	-	1	2	-	3
Division of Operations A	-	-	1	13	23	32	-	-	69	32	-	101
Division of Operations B	-	-	1	11	18	17	-	-	47	26	-	73
Division of Operations C	-	-	1	10	27	23	-	-	61	33	-	94
Division of Development d/	-	-	1	11	19	2	-	-	33	29	-	62
Division of Information Treatment e/	-	-	1	2	12	3	2	8	28	34	-	62
Division of Evaluation f/	-	-	1	5	13	2	-	-	21	14	-	35
Division of Standardization g/	-	-	1	4	5	1	1	-	12	13	-	25
Sub-total	-	1	7	56	117	80	3	8	272	183	-	455
Department of Administration	-	1	-	1	-	1	-	-	3	2	-	5
Office of Internal Audit and Management	-	-	-	1	3	2	1	-	7	5	-	12
Division of Budget and Finance	-	-	1	4	5	6	5	-	21	43	-	64
Division of General Services	-	-	1	2	2	2	2	1	10	71	26	107
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	24	-	36
Sub-total	-	1	7	17	18	18	12	1	74	170	26	270
Shared Support Services												
Contract Administration Services	-	-	1	-	1	-	-	-	2	4	-	6
Conference Services	-	-	-	1	-	1	3	-	5	7	-	12
Translation and Records Services	-	-	1	6	14	25	-	-	46	41	1	88
Interpretation	-	-	-	1	4	3	-	-	8	1	-	9
Medical Services	-	-	1	-	2	-	-	-	3	13	3	19
Library	-	-	-	1	-	1	2	1	5	10	-	15
Data Processing Services	-	-	-	3	9	10	6	5	33	27	-	60
Printing and Publishing Services	-	-	1	2	-	5	9	-	17	106	18	141
Sub-total	-	-	4	14	30	45	20	6	119	209	22	350
TOTAL	1	5	30	161	251	197	57	19	721	836	73	1630

a/ b/ c/ d/ e/ f/ and g/: See footnotes on Table 59.

Proposed transfer of posts in 1986

Table 63

	DG	DDG	D	P-5	P-4	P-3	P-2	P-1	Sub-Total	GS	M&O	Total
Department of Nuclear Energy and Safety												
Division of Scientific and Technical Information [b]	-	-	-	-	-	1	-	-	1	-	-	1
Sub-total	-	-	-	-	-	1	-	-	1	-	-	1
Department of Research and Isotopes												
Division of Life Sciences	-	-	-	-	2	-	-	-	2	1	-	3
The Agency's Laboratory	-	-	-	-	(2)	-	-	-	(2)	(1)	-	(3)
Sub-total	-	-	-	-	-	-	-	-	-	-	-	-
Department of Safeguards												
Division of Operations A	-	-	-	-	(1)	(1)	-	-	(2)	(3)	-	(5)
Division of Operations B	-	-	-	2	3	8	-	-	13	7	-	20
Division of Operations C	-	-	-	(2)	(3)	(6)	-	-	(11)	(4)	-	(15)
Division of Standardization [g]	-	-	-	-	1	(1)	-	-	-	-	-	-
Sub-total	-	-	-	-	-	-	-	-	-	-	-	-
Department of Administration												
Division of External Relations	-	-	-	-	-	-	(1)	-	(1)	-	-	(1)
Legal Division	-	-	-	-	-	-	1	-	1	-	-	1
Division of Personnel	-	-	-	-	-	-	-	-	-	2	-	2
Sub-total	-	-	-	-	-	-	-	-	-	2	-	2
Shared Support Services												
Data processing services	-	-	-	-	-	(1)	-	-	(1)	-	-	(1
Printing and publishing services	-	-	-	-	-	-	-	-	-	(2)	-	(2
Sub-total	-	-	-	-	-	(1)	-	-	(1)	(2)	-	(3
TOTAL	-	-	-	-	-	-	-	-	-	-	-	-

[b] Excluding Data Processing Services and Library which are shown under Shared Support Services.
Full title of the respective Division is:
[g] Division of Standardization, Training and Administrative Support

TRANSFER OF POSTS IN 1986

Table 63 shows the transfer of posts 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:

- One P-3 post is transferred from Data Processing Services to the Scientific Journals Unit in the Division of Scientific and Technical Information for a staff member who will satisfy the Chinese language requirements of the Scientific Journals Unit and, if necessary, the INIS Section;

- Two P-4 posts and 1 GS post are transferred from the Agency's Laboratory to the Division of Life Sciences as a result of Departmental reorganization;

- Several posts are transferred among Divisions in the Department of Safeguards in order to take into account changes in workload projections.

- One P-2 post from the Division of External Relations is transferred to the Legal Division since it is considered appropriate that work carried out in connection with the registering of agreements should be handled by the Legal Division;

- Two GS posts from the Division of Publications are transferred to the Division of Personnel since most of the work performed by the incumbents has been word processing work for the latter Division.

APPROPRIATION SECTION 1

TECHNICAL ASSISTANCE AND CO-OPERATION

APPROPRIATION SECTION 1: TECHNICAL ASSISTANCE AND CO-OPERATION

Summary of cost

Table 64

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	2 236 620	2 678 000	36 000	1.3	2 714 000	12 000	0.4	2 726 000	3.2	2 801 000	5.2	2 960 000
Consultants	93 240	51 700	18 300	35.4	70 000	-	-	70 000	6.5	74 600	6.5	79 400
Overtime	5 716	3 100	(3 100)	(100.0)	-	-	-	-	5.0	-	5.0	-
Temporary assistance	193 900	80 900	29 000	35.8	109 900	100	0.1	110 000	5.0	115 400	5.0	121 300
Common staff costs	849 916	1 018 000	(900)	(0.1)	1 017 100	4 900	0.5	1 022 000	3.2	1 050 400	5.2	1 109 200
Equipment	71 054	-	-	-	-	-	-	-	4.0	-	4.0	-
Supplies	7 437	-	-	-	-	-	-	-	4.0	-	4.0	-
Hospitality	1 854	1 200	800	66.7	2 000	-	-	2 000	-	2 000	-	2 000
Travel	85 568	113 600	1 400	1.2	115 000	-	-	115 000	4.7	120 400	4.7	126 100
Common services	46 614	55 500	(500)	(0.9)	55 000	-	-	55 000	5.0	57 800	5.0	60 700
Other	-	65 000	(51 000)	(78.5)	14 000	58 000	414.3	72 000	3.0	14 400	3.0	76 300
Sub-total: Direct costs	3 591 919	4 067 000	30 000	0.7	4 097 000	75 000	1.8	4 172 000	3.4	4 236 000	5.1	4 535 000
Translation and records services	328 523	332 000	(11 000)	(3.3)	321 000	4 000	1.2	325 000	3.1	331 000	5.2	352 000
Data processing services	536 885	595 000	(16 000)	(2.7)	579 000	-	-	579 000	3.4	599 000	4.3	624 000
Printing and publishing services	13 951	28 000	11 000	39.3	39 000	(4 000)	(10.3)	35 000	4.6	41 000	5.0	38 000
Sub-total: Shared costs	879 359	955 000	(16 000)	(1.7)	939 000	-	-	939 000	3.4	971 000	4.4	1 014 000
T O T A L	4 471 278	5 022 000	14 000	0.3 b/	5 036 000	75 000	1.5	5 111 000	3.4	5 207 000	5.0	5 549 000

a/ percentages as applied at the Area of Activity level

b/ On a comparable basis, this figure corresponds to 0.7% growth. See Table 55 and the Introduction for further explanation.

APPROPRIATION SECTION 1: TECHNICAL ASSISTANCE AND CO-OPERATION

Summary of manpower

Table 65

	1986 Adjusted				1987				1988 a/			
	P	GS	M&O	Total	P	GS	M&O	Total	P	GS	M&O	Total
Technical Assistance and Co-operation	41	53	-	94	41	62	-	103	41	62	-	103

a/ See Introduction, para 94

APPROPRIATION SECTION 2

NUCLEAR ENERGY AND SAFETY

APPROPRIATION SECTION 2: NUCLEAR ENERGY AND SAFETY

Summary of cost

Table 66

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	5 228 406	5 613 000	(95 000)	(1.7)	5 518 000	11 000	0.2	5 529 000	2.8	5 672 000	5.1	5 976 000
Consultants	505 993	471 800	36 600	7.8	508 400	49 400	9.7	557 800	6.5	541 300	6.5	632 900
Overtime	15 847	12 400	1 000	8.1	13 400	100	0.7	13 500	5.0	14 100	5.0	14 600
Temporary assistance	147 422	126 400	(30 600)	(24.2)	95 800	(1 900)	(2.0)	93 900	5.0	100 900	5.0	103 400
Common staff costs	1 986 794	2 132 500	(61 600)	(2.9)	2 070 900	4 100	0.2	2 075 000	2.8	2 128 500	5.1	2 241 700
Equipment	163 404	109 500	63 500	58.0	173 000	11 000	6.4	184 000	4.0	179 800	4.0	199 100
Supplies	82 904	49 500	20 100	40.6	69 600	9 000	12.9	78 600	4.0	72 000	4.0	84 800
Scientific and technical contracts	767 183	786 000	34 000	4.3	820 000	6 000	0.7	826 000	4.1	853 000	4.1	896 000
Training	6 759	10 300	(4 100)	(39.8)	6 200	4 000	64.5	10 200	3.0	6 400	3.0	10 800
Conferences, symposia, seminars	210 109	322 000	78 000	24.2	400 000	(58 000)	(14.5)	342 000	2.3	411 000	2.3	357 000
Technical committees, advisory groups	901 857	1 243 000	(146 000)	(11.7)	1 097 000	58 000	5.3	1 155 000	2.3	1 122 000	2.3	1 207 000
Hospitality	35 531	35 100	2 400	6.8	37 500	1 000	2.7	38 500	-	37 500	-	38 500
Travel	278 720	250 800	5 900	2.4	256 700	8 900	3.5	265 600	4.7	269 100	4.7	291 000
Common services	330 816	290 600	26 900	9.3	317 500	7 400	2.3	324 900	5.0	333 400	5.0	358 200
Other	-	92 100	1 677 900	1 821.8	1 770 000	404 000	22.8	2 174 000	3.5	1 835 000	4.8	2 359 000
Sub-total: Direct costs	10 661 745	11 545 000	1 609 000	13.9	13 154 000	514 000	3.9	13 668 000	3.2	13 576 000	4.7	14 770 000
Contract administration services	56 213	68 000	2 000	2.9	70 000	(2 000)	(2.9)	68 000	3.4	70 000	4.3	72 000
Conference services	184 294	186 000	(1 000)	(0.5)	185 000	8 000	4.3	193 000	3.3	187 000	5.8	210 000
Translation and records services	476 285	469 000	(56 000)	(11.9)	413 000	(42 000)	(10.2)	371 000	3.1	423 000	5.2	404 000
Library	847 711	891 000	54 000	6.1	945 000	1 000	0.1	946 000	3.6	979 000	4.9	1 028 000
Data processing services	1 154 376	1 084 000	(83 000)	(7.7)	1 001 000	1 000	0.1	1 002 000	3.4	1 032 000	4.3	1 080 000
Printing and publishing services	2 170 680	2 222 000	187 000	8.4	2 409 000	29 000	1.2	2 438 000	4.6	2 520 000	5.0	2 677 000
Sub-total: Shared costs	4 889 559	4 920 000	103 000	2.1	5 023 000	(5 000)	(0.1)	5 018 000	3.7	5 211 000	5.1	5 471 000
T O T A L	15 551 304	16 465 000	1 712 000	10.4	18 177 000	509 000	2.8	18 686 000	3.4	18 787 000	4.8	20 241 000

a/ percentages as applied at the Area of Activity level

Expenditure by Division

Table 67

Division	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
Nuclear Power	2 960 220	3 122 000	293 000	9.4	3 415 000	(65 000)	(1.9)	3 350 000	3.1	3 521 000	5.0	3 626 000
Nuclear Fuel Cycle	2 919 890	3 173 000	127 000	4.0	3 300 000	202 000	6.1	3 502 000	3.1	3 402 000	4.7	3 781 000
Nuclear Safety	5 205 961	5 411 000	1 256 000	23.2	6 667 000	359 000	5.4	7 026 000	3.3	6 887 000	4.7	7 598 000
Scientific and Technical Information a/	4 465 233	4 759 000	36 000	0.8	4 795 000	13 000	0.3	4 808 000	3.8	4 977 000	4.9	5 236 000
Total Appropriation Section	15 551 304	16 465 000	1 712 000	10.4	18 177 000	509 000	2.8	18 686 000	3.4	18 787 000	4.8	20 241 000

a/ These figures do not include the cost of the Computer Section and the Library which can be found in Table 126, Shared Support Services.

Manpower by Division

Table 68

Division	1986 Adjusted P	GS	M&O	Total	1987 P	GS	M&O	Total	1988 a/ P	GS	M&O	Total
Nuclear Power	23	12	-	35	23	13	-	36	23	13	-	36
Nuclear Fuel Cycle	22	13	-	35	22	13	-	35	22	13	-	35
Nuclear Safety	31	23	-	54	31	24	-	55	31	24	-	55
Scientific and Technical Information b/	18	30	-	48	18	33	-	51	18	33	-	51
Total Appropriation Section	94	78	-	172	94	83	-	177	94	83	-	177

Note: Does not include possible additional manpower for the SNSP.
a/ See Introduction, para 94
b/ These figures do not include the Data Processing Services and the Library, the manning table for which is shown in Table 59, under "Shared Support Services".

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 1987-88

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: STRENGTHENING CAPABILITIES FOR NUCLEAR POWER PROGRAMME PLANNING			
1. Technical report [2] on mechanisms to assist developing countries in the promotion and financing of their nuclear power programmes	AGM 87/1 AGM 87/2		1987
2. Technical report - Guidebook on electricity demand forecasting for nuclear power planning	AGM 87/3	Data processing	1987
3. 2-3 annual training courses on energy planning and on electric system expansion planning	TC		1987 1988
4. Technical report - Energy, electricity and nuclear power estimates for the period up to 2000 (RDS-1)	TCM 87/4 TCM 88/1 UN, IBRD data	As above	Annually
5. Technical report on nuclear power status and trends (jointly with A.2.02)	PRIS	As above	Annually
6. 1-2 papers for publication		As above	Annually
PROJECT A.1.02: DEVELOPMENT OF LONG-TERM NUCLEAR POWER PROGRAMME PLANS			
7. Technical report - National experience with energy, electricity and nuclear power planning studies in developing countries	AGM 87/5 AGM 88/2		1988
8. Technical report on use of Agency's FINPLAN model for financial analysis of nuclear power programmes in developing countries	AGM 88/3	Data processing	1989
9. 1-2 annual regional workshops for WASP users	TC		1987/88
10. Advisory missions (about 12 annually)	TC, IBRD	As above	1987/88
11. Support for TC projects (1 interregional and about 5 country projects)	TC		
12. 1-2 technical reports annually on energy and nuclear power planning studies for individual countries	TC	As above	1987 1988
PROJECT A.1.03: SMPR CASE STUDIES FOR DEVELOPING COUNTRIES			
13. Technical report on constraints for introduction of SMPRs in developing countries	Missions 1986		1987
14. Technical document on promising locations for SMPRs	AGM 87/6		1987
15. Technical document on SMPR capital costs	AGM 88/4		1988
16. 1-2 technical reports on case studies for SMPRs in developing countries	TC project		1989

[1] For publications, the date given is that by which the manuscript is due to be completed.

[2] Throughout these tables, the term "Technical document" is used to denote an unpriced publication while the terms "Technical report" and "Safety Series" indicate priced publications.

Table 69 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT A.1.04: CASE STUDY FOR LOW-TEMPERATURE NUCLEAR-HEAT APPLICATION			
17. Technical document containing guidelines for low-temperature heat application feasibility study	AGM 87/7		1987
18. Technical report on status of low-temperature nuclear heat applications	TCM 88/5		1988
19. Technical report - Case study on low-temperature nuclear heat applications	TC project		
PROJECT A.1.05: DISSEMINATION OF INFORMATION ON AND GUIDELINES FOR NUCLEAR POWER IMPLEMENTATION			
20. Technical report - Guidebook on research and development support for nuclear power	AGM 86 AGM 87/8		1987
21. Technical report - Guidebook on continuing education for nuclear power	CM 87 AGM 88/6		1989
22. Technical report - Guidebook on technician training for nuclear power	AGM 86		1987
23. Technical report on experience with technology transfer	AGM 86		1987
24. 1-2 interregional training courses annually	TC		1987/88
PROJECT A.1.06: PROJECT FEASIBILITY STUDIES AND INFRASTRUCTURE DEVELOPMENT PLANNING IN INDIVIDUAL COUNTRIES			
25. Support for 20-25 TC projects, including six advisory missions annually	TC		
PROJECT A.1.07: STRENGTHENING CAPABILITIES IN PROJECT EXECUTION			
26. Six national courses annually (focusing on bidding process and project and operations management)	TC		1987 1988
27. Six advisory missions annually (focusing on manpower, infrastructures, scheduling and control)	TC		1987 1988
28. Support for 5-8 TC projects	TC		

Table 70

Area of Activity A.2 Technical and Economic Performance of Nuclear Power

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 document on performance analysis on operating experience (computer printout)	AGM 87/9 AGM 88/7	As above	1987 1988
3. Technical report - Power reactors in the world (RDS-2)	Annual questionnaire	As above	Annually
4. Technical report - Guidebook on the use of PRIS		As above	1987
5. Provision of about 50 special data sets on request		As above	Annually
6. 1-2 papers for publication		As above	Annually
7. Conference on nuclear power performance and safety (jointly with A.2.05) (1987)			Proceedings, 1988
PROJECT A.2.02: ASSESSMENT OF AND EXCHANGE OF INFORMATION ON NUCLEAR POWER PLANT PERFORMANCE			
8. Technical report on nuclear power status and trends (jointly with A.1.01)	PRIS	Data Processing	Annually
9. Five technical documents annually on specific reliability problem areas (subjects to be decided after IWG meetings in 1986)	IWG 87/10 IWG 88/8 SPMs 87/11 SPMs 88/9		1987/88
10. Technical report on optimization of steel surveillance programmes and their analyses	CRP 84-88		1988
11. Technical report on modelling approaches for nuclear power plant simulators	CRP 85-88		1988
12. Support for 5-8 TC projects	TC		
PROJECT A.2.03: STRENGTHENING CAPABILITIES IN QUALITY ASSURANCE PROGRAMMES			
13. Manual on non-conformance and corrective action	AGM 87/12 AGM 88/10		1988
14. Manual on QA in regulatory organizations	AGMs 87/13 AGM 88/11		1988
15. Manual on QA in operations management	AGM 88/12		1989
16. Annual interregional training course on QA	TC		1987/88
17. 3-5 national training courses annually	TC		1987/88
18. 3-4 advisory missions annually	TC		1987/88
19. Support for about 10 TC projects	TC		
PROJECT A.2.04: QUANTIFICATION OF THE EFFECTIVENESS OF QA IN IMPROVING PLANT PERFORMANCE AND SAFETY			
20. Technical report on evaluating the effectiveness of QA in improving plant performance and safety	AGM 87/14 AGM 88/13		1989

Table 70 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT A.2.05: NUCLEAR POWER PLANT ECONOMIC ANALYSIS			
21. Conference on nuclear power performance and safety (1987) (jointly with A.2.01)	AGM 87/15		Proceedings, 1988
22. Advisory missions on nuclear power economics and bid evaluation (about 6 annually)	TC		1987/88
23. Technical report (periodic) on reference cost data for nuclear power planning studies in developing countries	AGM 88/14	Data processing	1987 1989
24. Technical report on improvements in economic performance of nuclear power plants	AGM 88/15	As above	1989
25. 1-2 papers for publication annually		As above	1987/88
26. Technical report (periodic) - Assessment of nuclear fuel cycle requirements (jointly with OECD/NEA)		As above	1989

Table 71

Area of Activity A.3 Advanced Systems and Technology Development

Task	Action or source	Services needed	Year of completion
PROJECT A.3.01: EXCHANGE OF INFORMATION ON THE IMPROVEMENT OF REACTOR TECHNOLOGIES FOR BETTER RESOURCE UTILIZATON			
1. Technical document - Annual review of LMFBR national development programmes	IWG 87/16 IWG 88/16		1987 1988
2. Four technical documents on fast breeder reactor technology development (topics to be selected by IWG)	SPMs 87/17 SPMs 88/17		1987
3. CRP on signal processing techniques for sodium boiling noise detection (84-87)	CM 84		1987
4. CRP on intercomparison of FBR core mechanics codes (86-88)	CM 85		1988
5. CRP on requirements for future application of advanced reactors (85-87)	CM 84		1988
6. Advisory missions to about two Member States per year	TC		1987/88
7. Technical document on status of light- and heavy-water converter reactors	TCM 87/18		1987
8. Technical document on tight lattice and spectral shift reactor concepts	SPM 88/18		1988
9. Technical document on the implications of advanced nuclear power technologies in developing countries	TCM 88/20		1988
10. Internal report - Advice to Secretariat on economic and safety design features of liquid metal reactors	AGM 87/19		1987
11. Internal report - Advice to Secretariat on the future role of the IAEA regarding advanced light- and heavy-water high converters	AGM 88/19		1988

Table 71 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT A.3.02: ASSESSMENT OF THE DEVELOPMENT OF "SIMPLE, CHEAP AND SAFE" REACTOR CONCEPTS			
12. Technical document - Review of development programmes for new LWR concepts	TCM 87/21		1987
13. Technical document on improvements to LWR technology	SPM 88/21		1988
14. Technical report on new LWR designs	TCM 87/21		1989
15. Advisory missions to about two Member States per year	TC		1987/88
16. CRP on improvement of light-water reactor technology (86-89)	TCM 86		1989
17. Internal report - Advice to the Secretariat on improved nuclear technologies for developing countries	AGM 87/20		1987
PROJECT A.3.03: EXCHANGE OF INFORMATION ON NUCLEAR HEAT APPLICATIONS			
18. Technical document - Review of HTGCR national development programmes	IWG 87/22		1987
19. Technical documents (4) on HTGCR (titles to be determined by IWG in 1987)	SPMs 87/23 SPMs 88/22		1987 1988
20. Technical report on industrial nuclear heat application	IWG 87/22		1989
21. CRP on design codes for gas-cooled reactor components (85-87)	CM 84		1988
PROJECT A.3.05: EXCHANGE OF INFORMATION ON FUSION RESEARCH AND ENGINEERING			
22. Two technical documents on fusion reactor design and/or engineering (topics to be determined by IFRC)	TCM 87/24 TCM 88/23		1987 1988
23. Two technical documents on fusion reactor technology (topics to be determined by IFRC)	SPMs 87/25 SPMs 88/24		1987 1988
24. Technical report on status of fusion			1988
25. CRP on lifetime calculations for the first wall of fusion reactors (86-88)	TCM 85		1989

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1987-88

With the limits of the appropriation and subject to the requirements of the programme as outlined for 1987-88, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

1987	Table
1. Advisory Group on mechanisms to assist developing countries in the promotion of their nuclear power programmes	69, No. 1

1987		Table
2.	Advisory Group on financing of nuclear power programmes in developing countries (sub-group of the Advisory Group on mechanisms)	69, No. 1
3.	Advisory Group to review final draft of guidebook on electricity demand forecasting for nuclear power planning	69, No. 2
4.	Technical Committee on energy and nuclear power planning in the United Nations system and other international organizations	69, No. 4
5.	Advisory Group to review national experience with energy, electricity and nuclear power planning (ENPP) studies in developing countries	69, No. 7
6.	Advisory Group on promising locations for SMPRs	69, No. 14
7.	Advisory Group on guidelines for low-temperature heat application feasibility study	69, No. 17
8.	Advisory Group on R + D support for nuclear power	69, No. 20
9.	Advisory Group on performance analysis on operating experience	70, No. 2
10.	Technical Committee (IWG) on reliability of reactor pressure components	70, No. 9
11.	Four Specialists' Meetings on subjects to be defined in 1986	70, No. 9
12.	Advisory Group on non-conformance and corrective action	70, No. 13
13.	Two Advisory Groups on QA in regulatory organizations	70, No. 14
14.	Advisory Group on evaluating the effectiveness of QA in improving plant performance and safety	70, No. 20
15.	Advisory Group for final preparation of conference on technical and economic performance of nuclear power	70, No. 21
16.	Technical Committee (IWG) on fast breeder reactor development	71, No. 1
17.	Two Specialists' Meetings on fast breeder reactor technology	71, No. 2
18.	Technical Committee on the status of light- and heavy-water converter reactors	71, No. 7
19.	Advisory Group on economic and safety design features of liquid metal reactors	71, No. 10

1987		Table
20.	Advisory Group on improved nuclear technolgies for developing countries	71, No. 17
21.	Technical Committee and workshop on design requirements for "simple, cheap and safe" reactors	71, Nos 12, 14
22.	Technical Committee (IWG) on high-temperature gas-cooled reactor development	71, Nos 18, 20
23.	Two Specialists' Meetings on high-temperature gas-cooled reactor technology	71, No. 19
24.	Technical Committee on fusion reactor design	71, No. 22
25.	Specialists' Meeting on fusion reactor technology	71, No. 23

1988		Table
1.	Technical Committee on energy and nuclear power planning in the United Nations system and other international organizations	69, No. 4
2.	Advisory Group on microcomputer models for electricity and nuclear power planning studies	69, No. 7
3.	Advisory Group on use of Agency's FINPLAN model for financial analysis of nuclear power programmes in developing countries	69, No. 8
4.	Advisory Group on SMPR capital costs	69, No. 15
5.	Technical Committee on status of low-temperature nuclear heat applications	69, No. 18
6.	Advisory Group on continuing education for nuclear power	69, No. 21
7.	Advisory Group on performance analysis on operating experience	70, No. 2
8.	IWG on nuclear power plant control and instrumentation	70, No. 9
9.	Four Specialists' Meetings on subjects to be defined in 1986-87	70, No. 9
10.	Advisory Group on non-conformance and corrective action	70, No. 13
11.	Advisory Group on QA in regulatory organizations	70, No. 14
12.	Advisory Group on QA in operations management	70, No. 15
13.	Advisory Group on evaluating the effectiveness of QA in improving plant performance and safety	70, No. 20

1988		Table
14.	Advisory Group on reference cost data for nuclear power planning studies in developing countries	70, No. 23
15.	Advisory Group on improvements in economic performance of nuclear power plants	70, No. 24
16.	Technical Committee (IWG) on fast breeder reactor development	71, No. 1
17.	Two Specialists' Meetings on fast breeder reactors	71, No. 2
18.	Specialists' Meeting on tight lattice and spectral shift light- and heavy-water reactors	71, No. 8
19.	Advisory Group on the future role of the IAEA on advanced light- and heavy-water high converters	71, No. 11
20.	Technical Committee on implications of advanced nuclear power technologies in developing countries	71, No. 9
21.	Specialists' Meeting on improvements to LWR technology	71, No. 13
22.	Two Specialists' Meetings on high-temperature gas-cooled rector technology	71, No. 19
23.	Technical Committee on fusion reactor engineering	71, No. 22
24.	Specialists' Meeting on fusion reactor technology	71, No. 23

DIVISION OF NUCLEAR FUEL CYCLE

ACTIONS PLANNED FOR 1987-88

Table 72

Area of Activity B.1 Resources and Supply of Uranium and Thorium

Task	Action or source	Services needed	Year of completion
PROJECT B.1.01: COLLECTION, EVALUATION AND MAINTENANCE OF DATA ON WORLD NUCLEAR FUEL RESOURCES AND RELATED GEOLOGICAL INFORMATION			
1. Biennial technical report - Assessment of uranium resources and supply (jointly with NEA (Red Book))	Questionnaire		1987
2. Internal reports on uranium resources: status and prospects	AGM 87/1 AGM 88/1		1988
3. Technical report on uranium geology and resources in the Middle East	TCM 86		1987
4. Technical report on uranium geology and resources in Europe	TCM 87/2		1988
5. Technical report on uranium resources and geology in North America	TCM 87/3		1988
6. Technical report on uranium resources and geology in Latin America	TCM 88/2		1989
7. Technical report - Assessment of world uranium resources: potential exploration areas	CM 87 TCM 88/3		1988
8. Maintaining the INTURGEO data base		Data processing	Continuing
9. Technical document - World atlas of uranium deposits	INTURGEO	As above	1988
PROJECT B.1.02: EXCHANGE OF INFORMATION ON URANIUM AND THORIUM GEOLOGY, EXPLORATION AND MINING			
10. Technical document - Manual on resource appraisal	CM 86		1987
11. Technical report on contractual arrangements for uranium exploration and production	CM 86, 87		1988
12. Technical report - Recognition criteria for uranium deposits	CM 86		1987
13. Technical report on uranium exploration, planning and practice	TCM 86 AGM 88/4		1988
14. Technical report on data integration and analysis	TCM 86		1987
15. Two technical reports on uranium geology (topics to be determined)	TCM 87/4 TCM 88/5		1987 1988
PROJECT B.1.03: PROVISION OF ASSISTANCE TO SPECIFIC DEVELOPING MEMBER STATES IN STRENGTHENING THEIR CAPABILITIES AND CAPACITIES REGARDING URANIUM EXPLORATION, ASSESSMENT AND ORE PRODUCTION			
16. Technical report - Manual on analytical methods for uranium exploration, development, mining and ore processing (jointly with B.2 - see Table 73, No. 5)	CM 86, 87		1987
17. Technical report - Manual on uranium exploration practice	CM 87, 88		1988
18. Technical report - Manual on mining practice	CM 87, 88		1988
19. Technical report - Manual on laboratory determination of U, Th, and K by gamma ray spectrometry	CM 87, 88		1988
20. Two training courses on uranium exploration	TC		1988
21. Support for 30-40 TC projects	TC		

Table 73

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

Task	Action or source	Services needed	Year of completion
PROJECT B.2.01: EXCHANGE OF INFORMATION ON THE STATUS OF AND TRENDS IN NUCLEAR AND REACTOR MATERIALS PRODUCTION AND PROCESSING TECHNOLOGY AND ON NUCLEAR FUEL CYCLE FACILITIES THROUGHOUT THE WORLD			
1. Technical report on uranium extraction technology (issued until 1983 by NEA)	CM 86, 87		1987
2. Technical document on Zircaloy production and performance	CM 87 TCM 87/5		1988
3. Technical document on nuclear fuel cycle facilities in the world	CM 87 NFCIS	Data processing	1987
PROJECT B.2.02: PROVISION OF GUIDANCE ON THE ESTABLISHMENT AND DEVELOPMENT OF NUCLEAR AND REACTOR MATERIALS PRODUCTION AND PROCESSING ACTIVITIES IN DEVELOPING COUNTRIES			
4. Technical report - Manual on pilot plant techniques for ore processing	CM 86, 87		1987
5. Technical report - Manual on analytical methods for uranium exploration, development, mining and ore processing (jointly with B.1 - see Table 72, No. 16)	CM 86		1987
6. Technical report - Guidebook on the development of projects for uranium mining and ore processing	CM 86,87		1987
7. Manual on economic evaluation techniques for uranium production projects	CM 87,88		1988
8. Training course on uranium ore processing	TC		1987
9. Support for 5-10 TC projects	TC		

Table 74

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

Task	Action or source	Services needed	Year of completion
PROJECT B.3.01: TO ENHANCE INTERNATIONAL CO-OPERATION IN THE IMPROVEMENT OF NUCLEAR REACTOR FUEL DESIGN, FABRICATION, UTILIZATION AND PERFORMANCE			
1. Seminar on methods of characterization and quality control of nuclear fuel and their feedback to fuel fabrication and behaviour (1988)			Summary report, 1988
2. Technical document on investigation of fuel element cladding interaction with water coolant in power reactors	CRP 82-86 CM 87		1987
3. CRP on examination and documentation methodology for water reactor fuel (83-88)	CM 88	Data Processing	Final report, 1989
4. CRP on water chemistry control and coolant interaction with fuel and primary circuit materials in water-cooled power reactors (87-91)		As above	1991
5. Technical document on power ramping, cycling and load following behaviour of water reactor fuel	TCM 87/6		1987
6. Technical report on water reactor fuel post-irradiation examination, inspection, reconstruction and repair	TCM 87/7		1988
7. Technical document on improvements in fuel utilization and recycling of plutonium and uranium	TCM 88/6		1988
8. Technical documents on properties of materials for water reactor fuel elements and measurement methods	TCM 86		1987
9. Technical document on advanced fuel for FBRs: fabrication, design and performance	TCM 87/8		1987
10. Technical document on the economics of the fuel cycle with alternative fuels	CM 87 TCM 88/7		1988
11. Internal report on fuel performance and technology	IWGFPT 87/9		1987
12. Training course on quality control of nuclear fuel	TC		1988
13. Support for 10-15 TC projects	TC		

Table 75

Area of Activity B.4 Spent Fuel Management

Task	Action or source	Services needed	Year of completion
PROJECT B.4.01: EVALUATION OF INFORMATION ON SPENT NUCLEAR FUEL ARISINGS AND CAPACITY REQUIREMENTS			
1. Technical document - Glossary of spent fuel storage terms (French and Spanish versions)	CM 86		1987
2. Technical document - Spent fuel management: current status and prospects	CM 88 AGM 88/8	Data processing	1988
3. Technical report - Updated guidebook on spent fuel storage	CM 86,87		1989
PROJECT B.4.02: TO ENHANCE INTERNATIONAL CO-OPERATION IN THE SELECTION OF SPENT FUEL STORAGE OPTIONS AND PRACTICES			
4. CRP on behaviour of spent fuel assemblies and storage equipment under long-term storage conditions (86-91)	CM 87	Data processing	1991
5. Technical document on spent fuel surveillance and monitoring methods	TCM 87/10		1988
6. Technical document on the economics of wet and dry spent fuel storage	CM 86,87		1989
7. Technical report on the improvement of structural materials resistance to chemical degradation and irradiation	CM 87 TCM 88/9		1989
8. Technical report on the decontamination of spent fuel storage and reprocessing facilities	CM 88		1990
9. CRP on the behaviour of structural materials under irradiation with emphasis on heterogeneous processes (87-91)	CM 87,88	As above	1991
10. Training course on spent fuel storage	TC		1988
11. Support for 2-5 TC projects	TC		
12. Symposium on the back end of the nuclear fuel cycle: strategy and options (1987)	CM 86,87		Proceedings 1988
PROJECT B.4.03: EXCHANGE OF INFORMATION ON SPENT FUEL TREATMENT, THE RECYCLING OF FISSILE MATERIALS AND THE RECOVERY AND UTILIZATION OF OTHER VALUABLE ELEMENTS			
13. Technical document on the status of MOX-fuel utilization in LWRs	CM 88		1990
14. Technical document on remote fuel fabrication technology using recycled fissile materials	CM 88		1990
15. Technical report on head-end technology of fuel treatment	CM 88		1990
16. Technical report on noble metal arisings and demand	CM 87,88		1990
17. Technical report on Sr and Cs arisings, demand and utilization	CM 87 TCM 88/10		1989

Table 76

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: TO DISSEMINATE TECHNICAL, SCIENTIFIC AND REGULATORY INFORMATION ON WASTE PROCESSING AND STORAGE			
1. Symposium on management of low- and intermediate-level wastes (1988)			Proceedings, 1988
2. Technical report on conditioning of alpha-bearing wastes	CM 87 TCM 87/11		1988
3. Technical report on consideration of technology and safety factors in evaluating conditioned spent fuels as a final waste form	CM 88 TCM 88/11		1988
4. Technical report on design and operation of high-level waste vitrification and storage facilities	CM 88 AGM 88/12		1989
5. Safety Series guide on design and operation of radioactive waste incineration facilities	CM 87 AGM 87/12		1988
6. Technical report on design and operation of cement incorporation systems for conditioning of radioactive waste	TCM 87/13 CM 88		1987
7. Technical report on volume reduction technologies for low- and intermediate-level combustible wastes	CM 88 TCM 88/13		1990
8. Technical report on design and operation of off-gas cleaning systems at low- and intermediate-level waste treatment and conditioning facilities	CM 87		1987
9. Technical report on design of ventilation and air-cleaning systems at non-fuel cycle facilities	CM 87 TCM 87/14		1988
10. Technical report on development of particulate filters for nuclear facilities	CM 88 TCM 88/14		1989
11. Technical report on handling and retention of airborne radionuclides at nuclear power plants during abnormal operations	CM 88 AGM 88/15		1989
PROJECT C.1.02: TO PROVIDE ASSISTANCE TO MEMBER STATES WITH, AND ENCOURAGE RESEARCH AND DEVELOPMENT ON, WASTE PROCESSING AND STORAGE TECHNOLOGY			
12. CRP on retention of iodine and other airborne radionuclides during abnormal and accident conditions (83-88)			1988
13. CRP on performance of solidified high-level waste forms and engineered barriers under repository conditions (84-88)			1988
14. CRP on evaluation of low- and intermediate-level radioactive solid waste forms and packages (85-89)			1989
15. CRP on use of inorganic sorbents for liquid waste treatment and backfill for underground repositories (86-92)			1992
16. Technical document on the assessment of arisings and methods of disposal of spent radiation sources	CM 88		1989
17. Technical document on handling and segregation of low-level waste generated by radioisotope users	CM 88		1989
18. Technical document on treatment of intermediate-level waste generated by radioisotope users	CM 88		1989
19. Support for 15-20 TC projects	TC		

Table 77

Area of Activity C.2 Radioactive Waste Disposal

Task	Action or source	Services needed	Year of completion
PROJECT C.2.01: PREPARATION OF REGULATORY GUIDELINES FOR THE UNDERGROUND DISPOSAL OF RADIOACTIVE WASTES			
1. Safety Series document on the regulation of underground repositories for the disposal of solid radioactive waste	CM 87 AGM 87/19 TRCUD 87/16 TRCUD 88/16		1988
2. Safety Series document on acceptance criteria for radioactive waste in deep geological formations	TRCUD 87/16 TRCUD 88/16		1988
3. Safety Series document on international standards for underground disposal of high-level waste	CM 87 TRCUD 87/16 TRCUD 88/16		1988
4. Safety Series code of practice on underground disposal of radioactive wastes	AGM 87/20 TRCUD 87/16 AGM 88/17 TRCUD 88/16		1989
5. Safety Series guide to the code on underground disposal of radioactive waste in shallow ground and rock cavities	TRCUD 87/16 TRCUD 88/16		1988
6. Safety Series guide to the code on underground disposal of radioactive waste in deep geological formations	TRCUD 87/16 TRCUD 88/16		1988
PROJECT C.2.02: TO ESTABLISH THE PRINCIPLES AND PRACTICE FOR EXEMPTING SOURCES OF RADIATION FROM REGULATORY CONTROL			
7. Safety Series report on the application of exempt quantities rules to decommissioning wastes and to the recycling of contaminated materials	TCM 87/18 CM 87		1988
8. Safety Series report on assessment methods for use in deriving exempt quantities for disposal in the marine environment	AGM 88/18		1988
PROJECT C.2.03: EXCHANGE OF INFORMATION AND DEVELOPMENT OF TECHNOLOGICAL AND ENGINEERING GUIDANCE ON UNDERGROUND DISPOSAL OF RADIOACTIVE WASTES			
9. Technical report on in situ experiments for the disposal of radioactive waste in deep geological formations	CM 87		1987
10. Safety Series document on siting, design and construction of geological repositories for high-level and alpha-bearing radioactive waste	TRCUD 87/16 TRCUD 88/16		1989
11. Safety Series document on operation, shutdown and closing of deep geological repositories	TRCUD 87/16 TRCUD 88/16		1989
12. Technical report on borehole plugging and shaft sealing related to underground disposal of long-lived radioactive waste	CM 87 TRCUD 87/16 TRCUD 88/16		1988
13. CRP on the geochemistry of neptunium and other actinides (86-91)			1991

Table 77 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT C.2.04: DEVELOPMENT OF REGULATORY CRITERIA FOR DISPOSAL OF RADIOACTIVE WASTE IN THE MARINE ENVIRONMENT			
14. Safety Series report on dose upper bound for sea disposal of radioactive waste	TCM 87/15 AGM 88/19		1988
15. Technical report on evaluation of impact of marine biota of dumping of radioactive waste	TCM 87/17		1988
16. Technical document on procedures for site specific modelling in coastal marine environment (Report of GESAMP Working Group)	CM 87		1988
17. Technical document on preliminary assessment of the radiological and environmental impact of sub-seabed disposal	CM 87		1988
18. Technical document - Report of GESAMP Working Groups on impact of sea-bed disposal	CM 87,88		1988
PROJECT C.2.07: TO ASSESS, AND TO DEVELOP METHODS FOR ASSESSING, THE RADIOLOGICAL AND ENVIRONMENTAL EFFECTS OF WASTE DISPOSAL PRACTICES			
Major component A: Safety Assessment of Waste Disposal			
19. Technical report on basic guidance for performing site specific environmental dose assessments	CM 87		1988
20. Technical report on the assessment of the environmental transfer of radionuclides in non-temperate environments; a review of the applicability of SS No. 57 in this context	AGM 87/22 CM 88		1989
21. Technical report on the effects of ionizing radiation on terrestrial organisms and ecosystems; a review of available information	AGM 87/21		1987
22. Technical report on environmental impact assessment; techniques and uses in relation to nuclear fuel cycle facilities	AGM 88/20 CM 88		1989
Major Component B: Environmental Behaviour of Radionuclides			
23. Technical report on migration and biological transfer of radionuclides from shallow land burial	CRP 85-89		1989
24. Monograph on environmental behaviour of radium			1987
25. Technical report on the use of natural analogues in relation to the safety assessment of geological disposal of high-level radioactive waste	AGM 88/21 CM 87		1989
PROJECT C.2.08: TO IMPROVE PUBLIC UNDERSTANDING AND ACCEPTANCE OF ESTABLISHED RADIOACTIVE WASTE DISPOSAL METHODS			
26. Technical report on public understanding of radioactive waste management issues	AGM 88/22		1988
PROJECT C.2.09: TO PROVIDE ASSISTANCE TO MEMBER STATES IN DEVELOPING THEIR NATIONAL RADIOACTIVE WASTE MANAGEMENT PROGRAMMES			
27. 2-3 advisory missions annually to developing Member States			1987/88
28. Waste Management Research Abstracts (jointly with NESI)			Annually

Table 78

Area of Activity C.3 Decommissioning of Nuclear Installations

Task	Action or source	Services needed	Year of completion
PROJECT C.3.01: ESTABLISHMENT OF GUIDELINES FOR THE DECOMMISSIONING OF NUCLEAR INSTALLATIONS			
Major Component A: Nuclear Facilities			
1. Technical report on remote system technology in decommissioning and rehabilitation of nuclear facilities	CM 88		1990
2. Technical report on the development of regulatory procedures for the decommissioning of nuclear facilities	TCM 87/23 AGM 88/23 CM 88		1990
3. Technical report on monitoring for compliance with criteria relating to waste management, decommissioning, termination survey or unrestricted use criteria	CM 88 TCM 88/24		1989
4. CRP on decontamination and decommissioning of nuclear facilities (84-87)			Final report, 1988
5. Technical report on development of decontamination technology	CM 88		1990
Major Component B: Mining and Milling Waste and Sites			
6. Technical report on the design of impoundment and disposal facilities for M/M tailing, conditioning of tailings for environment and the methodology and technology used in the rehabilitation and stabilization of tailing piles	TCM 88/25		1990
7. Technical report reviewing factors relevant to the decommissioning of M/M facilities, mines and sites and management of wastes from such operations	CM 88		1990

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1987-1988

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1987-88, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

1987		Table
1.	Advisory Group on uranium resources: status and prospects	72, No. 2
2.	Technical Committee on uranium resources and geology in Europe	72, No. 4
3.	Technical Committee on uranium resources and geology in North America	72, No. 5
4.	Technical Committee on uranium geology (topic to be decided)	72, No. 15

1987		Table
5.	Technical Committee on Zircaloy production and performance	73, No. 2
6.	Technical Committee on power ramping, cycling and load following behaviour of water reactor fuel	74, No. 5
7.	Technical Committee on water reactor fuel post-irradiation examination, inspection, reconstruction and repair	74, No. 6
8.	Technical Committee on advanced fuel for FBRs: fabrication, design and performance	74, No. 9
9.	International Working Group on Fuel Performance and Technology	74, No. 11
10.	Technical Committee on spent fuel surveillance and monitoring methods	75, No. 5
11.	Technical Committee on conditioning of alpha-bearing wastes	76, No. 2
12.	Advisory Group on design and operation of radioactive waste incineration facilities	76, No. 5
13.	Technical Committee on design and operation of cement incorporation systems for conditioning of radioactive wastes	76, No. 6
14.	Technical Committee on design of ventilation and air-cleaning systems at non-fuel cycle facilities	76, No. 9
15.	Technical Committee on dose upper bound for sea disposal of radioactive waste	77, No. 14
16.	Technical Review Committee on Underground Disposal of Radioactive Wastes (TRCUD)	77, Nos 1,2,3, 4,5,6,10,11, 12
17.	Technical Committee on evaluation of impact on marine biota of dumping of radioactive waste	77, No. 15
18.	Technical Committee on the application of exemption rules to decommissioning wastes and the recycling of contaminated materials	77, No. 7
19.	Advisory Group on the regulation of underground repositories for the disposal of solid radioactive waste	77, No. 1
20.	Advisory Group on development of code of practice on underground disposal of radioactive waste and guides to the code	77, No. 4

1987		Table
21.	Advisory Group on the effects of ionizing radiation on terrestrial organisms and ecosystems; a review of available information	77, No. 21
22.	Advisory Group on the assessment of the environmental transfer of radionuclides in non-temperate environments: a review of the applicability of SS No. 57 in this context	77, No. 20
23.	Technical Committee on the development of regulatory procedures for the decommissioning of nuclear facilities	78, No. 2
1988		
1.	Advisory Group on uranium resources: status and prospects	72, No. 2
2.	Technical Committee on uranium resources and geology in Latin America	72, No. 6
3.	Technical Committee on assessment of world uranium resources: potential exploration areas	72, No. 7
4.	Advisory Group on uranium exploration, planning and practice	72, No. 13
5.	Technical Committee on uranium geology (topic to be decided)	72, No. 15
6.	Technical Committee on improvements in fuel utilization and recycling of plutonium and uranium	74, No. 7
7.	Technical Committee on economics of the fuel cycle with alternative fuels	74, No. 10
8.	Advisory Group on spent fuel management: current status and prospects	75, No. 2
9.	Technical Committee on improvement of structural materials resistance to chemical degradation and irradiation	75, No. 7
10.	Technical Committee on strontium and cesium arisings, demand, recovery and utilization	75, No. 17
11.	Technical Committee on consideration of technology and safety factors in evaluating conditioned spent fuels as a final waste form	76, No. 3
12.	Advisory Group on design and operation of high-level waste vitrification and storage facilities	76, No. 4
13.	Technical Committee on volume reduction technologies for low- and intermediate-level combustible wastes	76, No. 7

1988		Table
14.	Technical Committee on development of particulate filters for nuclear facilities	76, No. 10
15.	Advisory Group on handling and retention of airborne radionuclides at nuclear power plants during abnormal operations	76, No. 11
16.	Technical Review Committee on underground disposal of Radioactive Wastes (TRCUD)	77, Nos 1,2,3, 4,5,6,10,11,12
17.	Advisory Group on the development of a code of practice on underground disposal of radioactive waste and guides to the code	77, No. 4
18.	Advisory Group on assessment methods for use in deriving exempt quantities for disposal in the marine environment	77, No. 8
19.	Advisory Group on dose upper bound for sea disposal of radioactive waste	77, No. 14
20.	Advisory Group on environmental impact assessment; techniques and uses in relation to nuclear fuel cycle facilities	77, No. 22
21.	Advisory Group on the use of natural analogues in relation to the safety assessment of geological disposal of high-level radioactive waste	77, No. 25
22.	Advisory Group on public understanding of radioactive waste management issues	77, No. 26
23.	Advisory Group on the development of regulatory procedures for the decommissioning of nuclear facilities	78, No. 2
24.	Technical Committee on monitoring for compliance with criteria relating to waste management, decommissioning, termination survey or unrestricted use criteria	78, No. 3
25.	Technical Committee on the design of impoundment and disposal facilities for M/M tailings, conditioning of tailings for disposal and the methodology and technology used in the rehabilitation and stabilization of tailing piles	78, No. 6

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 1987-88

Table 79

Area of Activity H.1 Occupational Radiation Protection and Health Effects

Task	Action or source	Services needed	Year of completion
PROJECT H.1.01: DEVELOPMENT OF OCCUPATIONAL RADIATION PROTECTION GUIDELINES			
1. Safety Series guide on the design of radiation protection systems in nuclear fuel fabrication plants	AGM 87/1 CM 88		1988
2. Safety Series guide on the safe use of industrial and medical radiation sources	AGM 87/2		1987
3. Safety Series guide on radiation protection services in uranium refineries and nuclear fuel fabrication plants	AGM 88/1		1989
4. Safety Series procedures and data for the calibration of radiation protection monitoring instruments	CM 86, 88 AGM 87/3		1988
5. Safety Series guide on the application of the BSS to operational radiation protection activities	CM 85 AGM 85		1987
6. Safety Series guide on radiation protection services for nuclear research reactors	CM 85 AGM 86		1987
7. Safety Series guide on radiation protection services in nuclear power plants	CM 85 AGM 86		1987
8. Safety Series guide on safe handling of tritium	TCM 86		1988
9. Safety Series guide on the assessment of occupational exposure to external irradiation	TCM 86		1987
10. Safety Series document on beta and gamma radiation monitoring	CM 88		1990
11. Safety Series document on personnel monitoring for exposure from radon and thoron daughters	CM 88		1990
12. Safety Series guide on minimum requirements for personnel monitoring	AGM 88/2 CM 88		1990
13. Intercomparison of personnel dosimeters	CRP 88-90		1990
14. Technical report on the intercomparison of personnel dosimeters	CRP 88-90		1990
PROJECT H.1.02: IMPLEMENTATION OF OCCUPATIONAL RADIATION PROTECTION GUIDELINES			
15. Conference on radiation protection in nuclear energy (1988) [1]			Proceedings, 1988
16. Seminar on the application of computer technology to radiation protection (1987)			Summary report, 1987
17. Review of BSS for radiation protection [1]	CM 87		1989
18. Technical document - Health Physics Research Abstracts [1]	Questionnaire		Annually
19. Technical report on procedures for the systematic appraisal of operational radiation protection programmes	AGM 87/4		1988

Table 79 (cont.) Task	Action or source	Services needed	Year of completion
20. Technical report on neutron spectra and detector responses for radiation protection purposes (in co-operation with CMEA)	CM 87		1990
21. Technical report on beta and gamma spectra and detector responses for radiation protection purposes	CM 87 TCM 88/3		1989
22. Technical report on the design of gamma irradiation facilities	CM 87 TCM 88/4		1989
23. Safety Series procedures and data on assessment of occupational intake of radioactive materials	CM 88		1990
24. Technical document on radiation protection aspects of fusion safety (in co-operation with NENP)	TCM 87/5		1989
25. Establishment of data base on occupational radiation exposure statistics and its use as a performance indicator of radiation protection practices (with NEA)	CM 87		1990
26. 4-5 research reactor health and safety missions annually			1987/88
27. 1-2 training courses annually on general radiation protection aspects[1]	TC		1987/88
28. Support for 40-60 TC projects (including OSART and RAPAT missions)	TC		
PROJECT H.1.03: DEVELOPMENT AND IMPLEMENTATION OF MEDICAL GUIDELINES FOR HANDLING OF PERSONS SUBJECTED TO UNACCEPTABLE EXPOSURES			
29. Safety Series guide on the use of thermography, cell membrane probes, EEG and other biological and biochemical indicators for estimating radiation dose	CM 85, 87 AGM 85 AGM 87/6		1988
30. Technical report on the calibration of chest monitoring equipment for assessing the intake of transuranium elements	CRP 83-86 CM 85		1988
31. Technical report on the decorporation of internal contamination of actinides and uranium deposited by inhalation	CRP 83-86 CM 86		1988
32. Technical report (biennial) on inventory of facilities (hospitals, laboratories, centres) internationally available for the treatment of over-exposed persons			1987
33. Annual technical report on the frequency and causes of radiological accidents involving health effects	CM 86 TCM 88/5		1987 1988

[1] These tasks cover aspects of the entire radiation protection programme.

Table 80

Area of Activity H.2 Radiation Protection of the General Public

Task	Action or source	Services needed	Year of completion
PROJECT H.2.01: DEVELOPMENT OF GUIDELINES FOR THE RADIATION PROTECTION OF THE GENERAL PUBLIC			
1. Safety Series guide on principles and methodologies for calculation of global upper bounds	TCM 87/7		1987
2. Technical documents with detailed guidance on the method for assessing individual and collective doses in relation to the limitation of releases of radioactive effluents into the environment	CM 87 AGM 88/6		1989
3. Safety Series guide on methods of identifying critical group and critical exposure pathway	CM 88		1990
4. Safety Series guide on methods of monitoring for the radiation protection of the public	CM 87, 88 AGM 87/8 AGM 88/7		1988
5. Safety Series guide on controlling consumer products containing radioactive substances	CM 87 AGM 88/8		1989
6. Safety Series guide on the optimization of radiation protection from radon decay products	CM 88		1992
7. Safety Series guide on the application of the principles of radiation protection to sources of potential exposure	CM 85,86,87 AGM 85 AGM 87/9		1987
8. Safety Series document on radiation protection principles for limiting exposures to natural sources of radiation (relates also to H.1)	CM 88		1992
PROJECT H.2.02: IMPLEMENTATION OF GUIDELINES FOR THE RADIATION PROTECTION OF THE GENERAL PUBLIC			
9. Safety Series procedures and data for the application of the principles for limiting radioactive releases from the mining and milling of radioactive ores	CM 86 AGM 86		1987
10. Safety Series procedures and data for the application of the principles for limiting radioactive releases in the case of nuclear power plants	AGM 86 CM 86		1987
11. Safety Series procedures and data for the application of the principles for limiting radioactive releases in the case of fuel reprocessing plants	CM 86 AGM 87/10		1987
12. Technical document on the radiological impact due to carbon-14 released from nuclear facilities	CRP 80-86		1988
13. Establishment of data base of models, parameters and computer programs for the assessment of individual and collective dose per unit release of radioactive effluents into the environment	CMs 88	Data processing	1990
14. CRP on dose intake factors for the public (87-89)			1989
15. Establishment of an international registry system for consumer products containing radioactive substances	CM 88		1990
16. CRP on exposure to radon decay products in the human environment (87-90)	CM 87		1990
17. Training course on monitoring for the radiation protection of the public	TC		1988
18. Support for 40-60 TC projects	TC		

Table 81

Area of Activity H.3 Safe Transport of Radioactive Materials

Task	Action or source	Services needed	Year of completion
PROJECT H.3.01: MAINTENANCE AND REVISION OF THE TRANSPORT REGULATIONS AND SUPPORTING DOCUMENTS			
1. Technical review of the Agency's transport safety activities	TCM 86 TCM 88/9		Continuing
2. Safety Series guide on optimization of radiation protection in transport	CM 87 AGM 88/10		1988
3. Technical document on sample optimization for demonstrating compliance with BSS	TCM 86 CM 87 AGM 88/10		1989
4. Technical report on the assessment of the radiological impact from the transport of radioactive materials	CM 87 TCM 88/11		1988
5. Technical document on guidance for ensuring safety and compliance with the Regulations for the Safe Transport of Radioactive Materials	CM 86,87		1988
6. CRP on the radiation protection implications of transport accidents involving radioactive materials (86-89)			1989
7. Periodic updating of Safety Series No. 6, Regulations for the Safe Transport of Radioactive Materials	AG 86 CM 87,88 TCM 87/11 TCM 88/9		1992
8. Safety Series document - Schedules of requirements for transport	CM 87,88 TCM 87/11		1993
9. Safety Series No. 37, Advisory Material for the Application of Safety Series No. 6	CM 87,88 TCM 87/11		1992
10. Safety Series No. 7, Explanatory Material for Safety Series No. 6	CM 87,88 TCM 87/11		1993
PROJECT H.3.02: IMPLEMENTATION OF THE TRANSPORT REGULATIONS			
11. Maintaining a directory of national competent authorities for transport	Data from Member States		Annually
12. Maintaining a directory of competent authorities' approval certificates	As above	Data processing	Semi-annually
13. Technical report - Assessment of implementation by Member States of Safety Series No. 6	CM 88		1989
14. Maintaining a directory of test facilities for transport packages	Data from Member States		1988
15. Maintaining a data base on radiation exposure in transport	As above	As above	Continuing
16. Maintaining a data base on transport accidents and incidents	As above	As above	Continuing
17. Maintaining a data base on shipment of radioactive materials	As above	As above	Continuing
18. Seminar on the adoption, application and implementation of the Agency's regulations for the safe transport of radioactive materials (1987)			Summary report, 1987
19. Support for 5-10 TC projects	TC		

Table 82

Area of Activity H.4 Emergency Planning and Preparedness

Task	Action or source	Services needed	Year of completion
PROJECT H.4.01: DEVELOPMENT OF GUIDELINES FOR EMERGENCY PLANNING AND PREPAREDNESS			
1. Safety Series guide on the monitoring of the accident release source in a nuclear installation	CM 86,87 AGM 86 AGM 87/12		1987
2. Revision of Safety Series No. 55 (issued in 1981), Planning for Off-Site Response to Radiation Accidents in Nuclear Facilities	CM 86		1987
3. Revision of Safety Series 50-SG-06 (issued in 1982), Preparedness of Operating Organization (Licensee) for Emergencies at Nuclear Power Plants	CM 86		1987
4. Revision of Safety Series 50-SG-G6 (issued in 1982), Preparedness of Public Authorities for Emergencies at Nuclear Power Plants	CM 86		1987
5. Information circular (INFCIRC) on public information in the event of a nuclear accident or radiological emergency	CM 86,87		1987
6. Safety Series guide on the provision of emergency procedures for accidents involving radioactive materials	CM 87 AGM 87/13 CM 88		1988
7. Revision of technical document (issued in 1980) on potential emergency assistance resources, requirements and status of emergency planning and preparedness in Member States		Data processing	1988
8. Safety Series guide on radiological protection principles applying to the control of off-site emergency workers under accident conditions at a nuclear installation	CM 87,88 AGM 87/14		1988
PROJECT H.4.02: IMPLEMENTATION OF GUIDELINES FOR EMERGENCY PLANNING AND PREPAREDNESS			
9. Evaluation of emergency plans and preparedness at the request of Member States (four advisory missions per year and reports)	TC		1987 1988
10. In-country and regional training courses in emergency planning and preparedness at the request of Member States (3 courses per year)	TC		1987 1988
11. Third interregional training course in planning, preparedness and response to radiological emergencies	TC		1987

Table 83

Area of Activity I.1 Safety Principles and Regulatory Organization

Task	Action or source	Services needed	Year of completion
PROJECT I.1.01: DEVELOPMENT OF SAFETY PRINCIPLES			
1. Nuclear Safety Review	Consultants		Annually
2. Technical documents - INSAG conclusions on current safety issues	CM 87,88 AGMs 87/15 TCMs 87/16 AGMs 88/12 TCMs 88/13		Annually

Table 83 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT I.1.02: DEVELOPMENT AND IMPLEMENTATION OF GUIDELINES FOR REGULATING SAFETY			
3. NUSS Newsletter	AGM 87/17 AGM 88/14		Annually
4. Technical document - Manual on regulatory review and assessment	CM 87 AGM 88/15		1988
5. Support for 30-40 TC projects (including 2-4 missions annually)	TC		

Table 84

Area of Activity I.2 Safety Research and Analysis

Task	Action or source	Services needed	Year of completion
PROJECT I.2.01: EXCHANGE OF INFORMATION ON SAFETY ISSUES AND RESEARCH			
1. Technical document on criteria for design bases for nuclear power plants	CM 87 AGM 88/16		1988
2. Technical document - Nuclear Safety Research Abstracts	CM 87,88 TCM 87/18 TCM 88/17		Annually
3. Two technical documents on specific research topics (to be determined annually)	CM 87,88 TCM 87/19 TCM 88/18		Annually
4. Symposium on safety aspects of the ageing and maintenance of nuclear power plants (1987)			Proceedings, 1987
5. Symposium on the implication of severe accidents for the design and licensing of nuclear power plants (1987)			Proceedings, 1987
PROJECT I.2.02: ASSISTANCE WITH SAFETY ASSESSMENT			
6. Technical document - IAEA programme on computer-aided safety analysis	CM 87,88 TCM 87/20 TCM 88/19		1988
7. Support for 2-5 TC projects	TC		
PROJECT I.2.03: IMPLICATIONS OF SOURCE TERM REASSESSMENT			
8. Technical document on source term reassessment	CM 87,88 TCM 87/21		1988

Table 84 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT I.2.04: DEVELOPMENT OF GUIDANCE AND PROVISION OF ASSISTANCE FOR PROBABILISTIC SAFETY ASSESSMENT			
Major Component A: Development of Guidance for PSA			
9. Technical document on advances in reliability analysis and probabilistic safety assessment	TCM 87/22		1988
10. Technical document on use of PSA for online operational safety management	TCM 87/23 CM 88		1988
11. Annual technical report on case studies demonstrating utilization of PSA for safety decisions	CM 87,88 TC		1987 1988
12. Technical document on development of risk criteria for the whole nuclear fuel cycle	CRP 83-87 CM 87		1987
13. Technical document on use of expert systems in nuclear safety	TCM 88/20		1989
14. Technical report on use of PSA for guidance in the relicensing of extended power plant lifetimes	TCM 88/21		1989
15. Two technical documents on probabilistic safety criteria	CM 87,88 TCM 87/24 TCM 88/22		1987 1988
16. Technical document on operator experience with computerized support systems	CM 87 TCM 87/25		1987
17. Technical document on human performance requirements for plant operating staff	TCM 88/24 CM 88		1989
18. Technical document on evaluation of reliability data sources	TCM 88/23		1988
19. CRP on collection of PSA data from operating experience (87-90)			1990
Major Component B: Provision of Assistance for PSA			
20. 3-4 training courses on various aspects of PSA	TC		1987/88
21. Support for interregional TC project (including workshops and missions)	TC		1987/88
PROJECT I.2.05: DEVELOPMENT OF RISK MANAGEMENT PROCEDURES GUIDE			
Major Component A: Joint IAEA/ILO/UNEP/WHO Project on Risk Management			
22. 5-7 national case studies			
23. Technical document on hazard control	TCM 88/25		1988
24. Technical report - Risk management procedures guide	CM 87,88 TCM 88/26		1990
25. Technical report on data, methods and model evaluation	CM 88		1990
26. 3-4 training courses annually			1987/88
Major Component B: Cost-effectiveness of risk reduction			
27. Technical document on cost-effectiveness of risk reduction	CRP 82-88		1988

Table 85

Area of Activity I.3 Safe Siting, Design and Construction of Nuclear Installations

Task	Action or source	Services needed	Year of completion
PROJECT I.3.01: DEVELOPMENT AND IMPLEMENTATION OF GUIDELINES FOR THE SITING OF NUCLEAR INSTALLATIONS			
1. Technical document - Manual on probabilistic safety assessment for seismic events	CM 86 AGM 87/26		1987
2. Technical document - Manual on meteorology in nuclear power plant siting	CM 87 AGM 88/27		1988
3. Technical document on historical seismicity in the Mediterranean Basin	TC		1987
4. 2-3 regional or national workshops per year on siting of nuclear installations	TC		1987/88
5. Support for 40-45 TC projects	TC		
PROJECT I.3.02: DEVELOPMENT OF GUIDANCE ON AND PROVISION OF ASSISTANCE WITH THE REVIEW OF THE DESIGN AND CONSTRUCTION OF NUCLEAR INSTALLATIONS			
6. Technical document - Manual on management of nuclear power plant construction and its safety implications	CM 87 AGM 87/27		1987
7. Technical document - Manual on assessment of fire protection design at nuclear power plants	CM 88 AGM 88/28		1988
8. 2 training courses per year on a specific topic relating to particular nuclear power plant designs (e.g. BWR, PHWR and PWR)	TC		1987/88
9. Support for about 30 TC projects	TC		1987/88

Table 86

Area of Activity I.4 Operational Safety of Nuclear Installations

Task	Action or source	Services needed	Year of completion
PROJECT I.4.01: DEVELOPMENT OF GUIDELINES FOR THE SAFE OPERATION OF NUCLEAR INSTALLATIONS			
1. Technical document - Manual on in-service inspection for nuclear power plants	CM 86,87 AGM 87/28		1987
2. Technical document - Manual on operational limits and conditions for nuclear power plants	CM 87,88 AGM 88/29		1988
3. Safety Series guide on safety analysis of research reactors	CM 86,87 AGM 87/29		1987
4. Safety Series guide on safety criteria for the design and operation of research reactors	CM 86,87 AGM 87/30		1988
5. Safety Series guide on safety aspects of replacing radioactive components during upgrading of research reactors	CM 87,88 AGM 88/30		1988

Table 86 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT I.4.02: OPERATIONAL SAFETY REVIEWS OF NUCLEAR INSTALLATIONS			
6. 4-5 OSART missions per year to both nuclear power plants and research reactors	TC		1987/88
7. Technical document on feedback from OSART missions	CM 88 AGM 88/31		1988
8. Symposium on the feedback of operational safety experience from nuclear power plants (1988)			Proceedings, 1988
9. Seminar on safety aspects of research reactors and critical assemblies (1988)			Summary report, 1988
10. Seminar on safety of two loop PWRs (1987)			Summary report, 1987
PROJECT I.4.03: INCIDENT REPORTING SYSTEM (IRS)			
11. Maintaining a data base on incidents at nuclear power plants	TCM 87/31 TCM 88/32		Continuing
12. Technical document - Annual review and assessment of incidents at nuclear power plants	CM 87,88 TCM 87/32 TCM 88/33		1987 1988
13. Technical document - Revision of guidelines for national IRS	CM 87,88 TCM 87/33 TCM 88/34		1988

Table 87

Area of Activity I.5 Physical Protection of Nuclear Installations and Materials

Task	Action or source	Services needed	Year of completion
PROJECT I.5.01: ESTABLISHMENT AND MAINTENANCE OF A SPECIALIZED TRAINING PROGRAMME IN PHYSICAL PROTECTION OF NUCLEAR INSTALLATIONS AND MATERIALS			
1. 1-2 training courses on physical protection of nuclear installations and materials	TC		1987/88

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1987-88

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1987-88, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

1987	Table
1. Advisory Group on the design of radiation protection systems in nuclear fuel fabrication plants	79, No.1

1987		Table
2.	Advisory Group on the safe use of industrial and medical radiation sources	79, No.2
3.	Advisory Group on the calibration of radiation protection monitoring instruments	79, No.4
4.	Advisory Group for the systematic appraisal of operational radiation protection programmes	79, No.19
5.	Technical Committee on fusion safety (in co-operation with NENP)	79, No.24
6.	Advisory Group on advances in biological dosimetry	79, No.29
7.	Technical Committee on principles and methodologies for calculating global upper bounds	80, No.1
8.	Advisory Group on methods of monitoring for the radiation protection of the public	80, No.4
9.	Advisory Group on the application of the principles of radiation protection to sources of potential exposure	80, No.7
10.	Advisory Group on the application of the principles for limiting radioactive releases in the case of fuel reprocessing plants	80, No.11
11.	Technical Committee to review the regulations and and supporting documents for the safe transport of radioactive materials	81, Nos 7,8, 9,10
12.	Advisory Group on the monitoring of the accident release source in a nuclear installation	82, No.1
13.	Advisory Group on the provision of emergency procedures for accidents involving radioactive materials	82, No.6
14.	Advisory Group on radiological protection principles applying to the control of off-site emergency workers under accident conditions at a nuclear installation	82, No.8
15.	Three meetings of International Nuclear Safety Advisory Group (INSAG)	83, No.2
16.	Technical Committee on a topic recommended by INSAG (two meetings)	83, No.2
17.	Advisory Group on NUSS implementation	83, No.3
18.	Technical Committee on reactor safety research	84, No.2

1987		Table
19.	Technical Committee on a selected topic in reactor safety research	84, No.3
20.	Technical Committee (Workshop) on IAEA programme on computer-aided safety analysis	84, No.6
21.	Technical Committee on source term evaluation	84, No.8
22.	Technical Committee (Workshop) on advances in reliability analysis and probabilistic safety assessment	84, No.9
23.	Technical Committee on the use of PSA for online operational safety management	84, No.10
24.	Technical Committee on demonstrating compliance with probabilistic safety criteria	84, No.15
25.	Technical Committee on operator experience with computerized support systems	84, No.16
26.	Advisory Group on probabilistic safety assessment for seismic events	85, No.1
27.	Advisory Group on management of nuclear power plant construction and its safety implications	85, No.6
28.	Advisory Group on in-service inspection for nuclear power plants	86, No.1
29.	Advisory Group on safety analysis of research reactors	86, No.3
30.	Advisory Group on safety standards and criteria for the design and operation of research reactors	86, No.4
31.	Technical Committee - Joint IAEA/NEA meeting for exchange of information on incidents in nuclear power plants	86, No.11
32.	Technical Committee on assessment of incidents at nuclear power plants	86, No.12
33.	Technical Committee to revise the guide on national IRS	86, No.13
1988		
1.	Advisory Group on radiation protection services in uranium refineries and nuclear fuel fabrication plants	79, No.3
2.	Advisory Group on minimum requirements for personnel monitoring	79, No.12

1988		Table
3.	Technical Committee on beta and gamma spectra and detector responses for radiation protection purposes	79, No.21
4.	Technical Committee on the design of gamma irradiation facilities	79, No.22
5.	Technical Committee on frequency and causes of radiological accidents involving health effects	79, No.33
6.	Advisory Group on detailed guidance on the method for assessing individual and collective doses in relation to the limitation of releases of radioactive effluents into the environment	80, No.2
7.	Advisory Group on methods of monitoring for the radiation protection of the public	80, No.4
8.	Advisory Group on controlling consumer products containing radioactive substances	80, No.5
9.	Technical Committee (SAGSTRAM) to endorse the revision of Safety Series No.6 and review the Agency's transport safety activities	81, Nos 1,7
10.	Advisory Group on optimization of radiation protection in transport and on sample optimization for demonstrating compliance with BSS	81, Nos 2,3
11.	Technical Committee on the assessment of the radiological impact from the transport of radioactive materials	81, No.4
12.	Three meetings of INSAG	83, No.2
13.	Technical Committee on a topic recommended by INSAG (two meetings)	83, No.2
14.	Advisory Group on NUSS implementation	83, No.3
15.	Advisory Group on regulatory review and assessment	83, No.4
16.	Advisory Group on criteria for design bases for nuclear power plants	84, No.1
17.	Technical Committee on reactor safety research	84, No.2
18.	Specialist meeting on a selected topic in safety research	84, No.3
19.	Technical Committee (Workshop) on IAEA programme on computer-aided safety analysis	84, No.6
20.	Technical Committee on use of expert systems in nuclear safety	84, No.13

1988		Table
21.	Technical Committee on use of PSA for guidance in re-licensing of extended lifetimes of power plants	84, No.14
22.	Technical Committee on the use of probabalistic safety criteria	84, No.15
23.	Technical Committee on evaluation of reliability data sources	84, No.18
24.	Technical Committee on human performance requirements for plant operating staff	84, No.17
25.	Technical Committee on hazard control	84, No.23
26.	Technical Committee on risk management procedures guide	84, No.24
27.	Advisory Group on meteorology in nuclear power plant siting	85, No.2
28.	Advisory Group on assessment of fire protection design at nuclear power plants	85, No.7
29.	Advisory Group on operational limits and conditions for nuclear power plants	86, No.2
30.	Advisory Group on safety aspects of replacing radioactive components during upgrading of research reactors	86, No.5
31.	Advisory Group on feedback from OSART missions	86, No.7
32.	Technical Committee - Joint IAEA/NEA meeting for exchange of information on incidents in NPPs	86, No.11
33.	Technical Committee on assessment of incidents at nuclear power plants	86, No.12
34.	Technical Committee to revise the guide on national IRS	86, No.13

DIVISION OF SCIENTIFIC AND TECHNICAL INFORMATION

ACTIONS PLANNED FOR 1987-88

Table 88

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
2. INIS Atomindex		Data processing	Semi-monthly
3. Microfilm document service			Continuing
4. Technical advice on system operation	INIS Liaison Officers' meeting, 87/1 88/1		1987/88
5. INIS training seminar			1987/88
6. Updating of technical input-output procedures (INIS Reference Series)	TCM 87/2 TCM 88/2		Annually

Table 89

Area of Activity A.3 Advanced Systems and Technology Development

Task	Action or source	Services needed	Year of completion
PROJECT A.3.05: EXCHANGE OF INFORMATION ON FUSION RESEARCH AND ENGINEERING			
1. Nuclear Fusion (journal)		Data processing	Monthly
2. Technical report - World Survey of Activities in Controlled Fusion Research	Questionnaire	As above	1988/89

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1987-1988

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1987-88, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

1987		Table
1.	Fifteenth Consultative Meeting of INIS Liaison Officers	88, No. 4

1987		Table
2.	Technical Committee on INIS input-output procedures	88, No. 6
1988		
1.	Sixteenth Consultative Meeting of INIS Liaison Officers	88, No. 4
2.	Technical Committee on INIS input-output procedures	88, No. 6

APPROPRIATION SECTION 3

RESEARCH AND ISOTOPES

APPROPRIATION SECTION 3: RESEARCH AND ISOTOPES

Summary of cost

Table 90

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	5 356 803	5 882 000	43 000	0.7	5 925 000	-	-	5 925 000	3.3	6 120 000	5.2	6 436 000
Consultants	241 279	220 000	35 500	16.1	255 500	(7 000)	(2.7)	248 500	6.5	272 100	6.5	281 700
Overtime	26 117	30 400	(1 900)	(6.3)	28 500	1 000	3.5	29 500	5.0	30 000	5.0	32 600
Temporary assistance	50 922	27 900	13 500	48.4	41 400	-	-	41 400	5.0	43 500	5.0	45 700
Common staff costs	2 035 586	2 233 900	(10 300)	(0.5)	2 223 600	(1 900)	(0.1)	2 221 700	3.3	2 294 200	5.2	2 414 500
Equipment	640 580	266 200	119 700	45.0	385 900	27 500	7.1	413 400	4.0	401 300	4.0	447 300
Supplies	527 900	411 300	(24 800)	(6.0)	386 500	11 800	3.1	398 300	4.0	401 900	4.0	430 900
Scientific and technical contracts	2 114 896	2 162 000	65 000	3.0	2 227 000	37 000	1.7	2 264 000	4.1	2 320 000	4.1	2 452 000
Training	1 378	18 500	(500)	(2.7)	18 000	2 000	11.1	20 000	3.0	18 500	3.0	21 200
Conferences, symposia, seminars	268 588	265 000	59 000	22.3	324 000	34 000	10.5	358 000	2.3	331 000	2.3	375 000
Technical committees, advisory groups	152 071	300 000	(11 000)	(3.7)	289 000	(12 000)	(4.2)	277 000	2.3	295 000	2.3	290 000
Hospitality	15 625	18 100	600	3.3	18 700	700	3.7	19 400	-	18 700	-	19 400
Travel	172 635	194 100	(1 000)	(0.5)	193 100	1 800	0.9	194 900	4.7	202 200	4.7	213 500
Common services	1 055 221	970 500	82 300	8.5	1 052 800	101 100	9.6	1 153 900	5.0	1 105 600	5.0	1 272 200
Non-shared transferred costs	(1 187 000)	(1 278 000)	(64 000)	5.0	(1 342 000)	(100 000)	7.5	(1 442 000)	4.2	(1 399 000)	5.1	(1 580 000)
Other	-	68 100	120 900	177.5	189 000	(12 000)	(6.3)	177 000	3.5	195 000	4.8	192 000
Sub-total: Direct costs	11 472 601	11 790 000	426 000	3.6	12 216 000	84 000	0.7	12 300 000	3.6	12 650 000	4.7	13 344 000
Contract administration services	246 021	273 000	22 000	8.1	295 000	14 000	4.7	309 000	3.4	307 000	4.3	335 000
Conference services	131 501	120 000	-	-	120 000	(1 000)	(0.8)	119 000	3.3	124 000	5.8	130 000
Translation and records services	246 760	223 000	15 000	6.7	238 000	2 000	0.8	240 000	3.1	243 000	5.2	260 000
Data processing services	254 317	313 000	(121 000)	(38.7)	192 000	1 000	0.5	193 000	3.4	198 000	4.3	209 000
Printing and publishing services	960 602	901 000	(39 000)	(4.3)	862 000	(9 000)	(1.0)	853 000	4.6	902 000	5.0	937 000
Sub-total: Shared costs	1 839 201	1 830 000	(123 000)	(6.7)	1 707 000	7 000	0.4	1 714 000	3.9	1 774 000	5.1	1 871 000
T O T A L	13 311 802	13 620 000	303 000	2.2	13 923 000	91 000	0.7	14 014 000	3.6	14 424 000	4.8	15 215 000

a/ percentages as applied at the Area of Activity level

Expenditure by Division

Table 91(a)

Division	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
Food and Agriculture	5 048 154	5 102 000	23 000	0.5	5 125 000	52 000	1.0	5 177 000	3.7	5 317 000	4.9	5 634 000
Life Sciences	2 921 175	3 001 000	214 000	7.1	3 215 000	3 000	0.1	3 218 000	3.5	3 328 000	4.7	3 488 000
Research and Laboratories	5 342 473	5 517 000	66 000	1.2	5 583 000	36 000	0.6	5 619 000	3.5	5 779 000	4.8	6 093 000
The Laboratory a/	[4 306 245]	[3 768 000]	-	-	[3 768 000]	[36 000]	[1.0]	[3 804 000]	[4.2]	[3 925 000]	[5.1]	[4 166 000]
Total Appropriation Section	13 311 802	13 620 000	303 000	2.2	13 923 000	91 000	0.7	14 014 000	3.6	14 424 000	4.8	15 215 000

a/ Cost included in these three Divisions

THE LABORATORY

Table 91(b)

Division	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
Total Laboratory	5 493 245	5 046 000	64 000	1.3	5 110 000	136 000	2.7	5 246 000	4.2	5 324 000	5.1	5 746 000
Safeguards Analytical Laboratory (charged to Safeguards)	1 187 000	1 278 000	64 000	5.0	1 342 000	100 000	7.5	1 442 000	4.2	1 399 000	5.1	1 580 000
Total, charged to Research and Isotopes	4 306 245	3 768 000	-	-	3 768 000	36 000	1.0	3 804 000	4.2	3 925 000	5.1	4 166 000
Consists of:												
Food and Agriculture	2 225 984	2 108 000	-	-	2 108 000	21 000	1.0	2 129 000	4.2	2 196 000	5.1	2 332 000
Life Sciences	393 877	373 000	-	-	373 000	4 000	1.1	377 000	4.2	388 000	5.1	413 000
Research and Laboratories	1 686 384	1 287 000	-	-	1 287 000	11 000	0.9	1 298 000	4.2	1 341 000	5.1	1 421 000

APPROPRIATION SECTION 3: RESEARCH AND ISOTOPES

Manpower by Division

Table 92

Division	1986 Adjusted P	GS	M&O	Total	1987 P	GS	M&O	Total	1988 a/ P	GS	M&O	Total
Food and Agriculture	16	8	-	24	17	8	-	25	17	8	-	25
Life Sciences	15	10	-	25	15	10	-	25	15	10	-	25
Research and Laboratories	27	18	-	45	27	18	-	45	27	18	-	45
Laboratory	28	56	25	109	28	57	25	110	28	57	25	110
Total Appropriation Section	86	92	25	203	87	93	25	205	87	93	25	205

Note: Does not include possible additional manpower for the SNSP.
a/ See Introduction, para 94

JOINT FAO/IAEA DIVISION OF ISOTOPE AND RADIATION APPLICATIONS OF ATOMIC ENERGY IN FOOD AND AGRICULTURAL DEVELOPMENT

ACTIONS PLANNED FOR 1987-88

Table 93

Area of Activity D.1 Agricultural Production

Task	Action or source	Services needed	Year of completion
PROJECT D.1.01: TO STRENGTHEN RESEARCH CAPABILITIES FOR OPTIMIZING USE OF WATER, FERTILIZERS AND OTHER AGROCHEMICALS			
1. CRP on soil-water management practices with special reference to minimum tillage and erosion (86-90) (in co-operation with RIRL)		Laboratory	1990
2. CRP on optimization of fertilizer and water uptake in tree crops (87-91)		As above	1991
3. Annual training course on soil-water-plant relationships	TC		1987/88
4. Technical report on the use of nuclear techniques in studies of biological nitrogen fixation by trees and tree crops	AGM 86		1987
5. Soils Newsletter (see also D.1.02 and D.1.03)			Quarterly
6. Support for 20-25 TC projects and individual fellowships	TC	As above	
PROJECT D.1.02: THROUGH THE USE OF ISOTOPE TECHNIQUES, TO FACILITATE RESEARCH AIMED AT ENHANCING BIOLOGICAL NITROGEN FIXATION			
7. CRP on isotopic studies of nitrogen fixation and nitrogen cycling in Azolla and blue-green algae (83-87)		Laboratory	1987
8. CRP on improving yield and N_2 fixation of grain legumes in South America and Africa (85-90)		As above	1990
9. Two annual training courses on the use of ^{15}N	TC		1987/88
10. Soils Newsletter (see also D.1.01 and D.1.03)			Quarterly
11. Support for 30-35 TC projects and individual fellowships	TC	As above	
PROJECT D.1.03: TO FACILITATE RESEARCH TO IMPROVE CROP PRODUCTION IN SALT-AFFECTED SOILS			
12. CRP on nuclear techniques to improve crop production in salt-affected soils (85-89)		Laboratory	1989
13. Soils Newsletter (see also D.1.01 and D.1.02)			Quarterly
14. Support for about 5 TC projects and individual fellowships	TC	As above	
PROJECT D.1.04: MAINTAINING A DATA BANK FOR INDUCED MUTANT GERM PLASM RESOURCES			
15. Maintenance of, and development of software for, mutant germ plasm database	Research contracts	Data processing	Continuing
16. Mutation Breeding Newsletter (see also D.1.05)			Quarterly
17. Support for 1-3 TC projects	TC		

Table 93 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT D.1.05: TO ASSIST THE DEVELOPMENT AND ACQUISITION OF SKILLS AND CAPABILITIES TO IMPROVE CULTIVARS THROUGH MUTATION BREEDING AND RELATED BIOTECHNOLOGICAL METHODS			
18. CRP on improvement of root and tuber crops in tropical countries (84-88)		Laboratory	1988
19. CRP on in vitro technology for mutation breeding (84-88)		As above	1988
20. CRP on semi-dwarf mutants for rice improvement in South East Asia (RCA) (81-87)		As above	1987
21. CRP on use of induced mutations in haploids (86-90)		As above	1990
22. CRP on mutation breeding of oil seed crops (86-90)		As above	1990
23. CRP on improvement of rice and other cereals through mutation breeding in Latin America (86-90) (ARCAL)		As above	1990
24. FAO/IAEA regional seminar on basic food crops in Africa (1987)			Summary report, 1987
25. Technical report on biotechnological methods in plant breeding	AGM 87/1		1988
26. Mutation Breeding Newsletter (see also D.1.04)			Quarterly
27. Annual training course on mutation breeding techniques	TC		1987/88
28. Support for 25-30 TC projects and individual fellowships	TC	As above	
PROJECT D.1.06: TO ESTABLISH AND STRENGTHEN RESEARCH CAPABILITIES FOR OPTIMIZING THE REPRODUCTIVE EFFICIENCY OF LIVESTOCK THROUGH THE USE OF RIA AND RELATED TECHNIQUES			
29. FAO/IAEA seminar for Latin America for improving the reproductive efficiency and health of livestock through RIA and related techniques (1987)			Summary report, 1987
30. CRP on improving sheep and goat productivity with the aid of nuclear techniques, with particular reference to Africa and the Middle East (83-87)		Laboratory	1987
31. CRP on application of RIA to improve the reproductive efficiency of large ruminants (83-87)		As above	1987
32. CRP for improving reproductive management of meat- and milk-producing livestock in Latin America (84-88)		As above	1988
33. Training course on immunoassay techniques	TC		1987
34. Animal Production and Health Newsletter (see also D.1.07 and D.1.08)			Semi-annually
35. Support for 20-25 TC projects and individual fellowships	TC		
PROJECT D.1.07: TO ESTABLISH AND ENHANCE CAPABILITIES FOR IMPROVING THE NUTRITION OF RUMINANT LIVESTOCK THROUGH THE USE OF NUCLEAR AND RELATED TECHNIQUES			
36. CRP on use of nuclear techniques to improve domestic buffalo production in Asia (84-88) (RCA)		Laboratory	1988
37. CRP on utilization of agro-industrial by-products (87-91)		As above	1991
38. Technical report on ruminant nutrition	AGM 88/1		1988
39. Training course on ruminant nutrition	TC		1987
40. Animal Production and Health Newsletter (see also D.1.06 and D.1.08)			Semi-annually
41. Support for 15-20 TC projects and individual fellowships	TC	Laboratory	

Table 93 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT D.1.08: TO STRENGTHEN CAPABILITIES FOR CONTROLLING LIVESTOCK DISEASES THROUGH THE USE OF RADIATION, IMMUNOASSAY AND RELATED BIOTECHNOLOGICAL METHODS			
42. CRP on use of nuclear techniques in the study and control of parasitic diseases in farm animals (83-87)		Laboratory	1987
43. CRP on improving diagnosis and control of livestock diseases (e.g. rinderpest, African swine fever, foot and mouth disease, brucellosis) (86-90)		As above	1990
44. Training course on disease diagnostics	TC		1988
45. Animal Production and Health Newsletter (ses also D.1.06 and D.1.07)			Semi-annually
46. Support for 15-20 TC projects and individual fellowships	TC	As above	
PROJECT D.1.09: TO STUDY THE FATE OF TRYPANOCIDAL DRUGS IN AFRICAN CATTLE USING RADIOISOTOPES			
47. Support for a TC project at the Kenya Trypanosomiasis Research Institute	TC	Laboratory	1988
48. Development of controlled release formulations of trypanocides	Sub-contract		1987/88
PROJECT D.1.10: ASSESSMENT OF DATA AND RESEARCH ON THE USE OF INDIGENOUS ORGANISMS FOR THE BIOCONVERSION OF AGRICULTURAL RESIDUES AND WASTES INTO ANIMAL FEEDS AND PLANT NUTRIENTS			
49. Internal report on the status of current technology for the bioconversion of agricultural wastes and residues	CM 87		1987
50. Interregional training course on the bioconversion of agricultural wastes	TC		1987

Table 94

Area of Activity D.2 Agricultural and Food Protection

Task	Action or source	Services needed	Year of completion
PROJECT D.2.01: ESTABLISHMENT OF CAPABILITIES FOR CONTROL OR ERADICATION OF FRUIT FLIES AND OTHER INSECT CROP PESTS USING THE STERILE INSECT TECHNIQUE AND RELATED BIOTECHNOLOGICAL METHODS			
1. FAO/IAEA symposium on modern insect control: nuclear techniques and biotechnology (1988)			Proceedings, 1988
2. CRP on development of sexing mechanisms in fruit flies through manipulation of radiation-induced conditional lethals and other genetic measures (83-87)		Laboratory	1987
3. CRP on F_1 sterility and other genetic methods for controlling crop pests (87-91)		As above	1991
4. CRP on medfly trapping techniques (86-90)		As above	1990
5. Training course on fruit fly control and eradication	TC		1988
6. Information Circular (see also D.2.02)			Quarterly
7. Support for 15-20 TC projects (including some large-scale) and individual fellowships	TC	As above	1987/88

Table 94 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT D.2.02: DEVELOPMENT OF PRACTICES AND ESTABLISHMENT OF CAPABILITIES FOR ERADICATION OR CONTROL OF TSETSE FLIES AND OTHER BLOOD-SUCKING INSECTS BY THE STERILE INSECT TECHNIQUE AND RELATED BIOTECHNOLOGICAL METHODS			
8. CRP on SIT for tsetse eradication or control (84-89)		Laboratory	1989
9. Technical report on genetic methods in insect control	AGM 87/2		1988
10. Training course on tsetse control and eradication	TC		1987
11. Information Circular (see also D.2.01)			Quarterly
12. Support of 4-6 TC projects (including some large-scale) and individual fellowships		As above	1987/88
PROJECT D.2.03: TO ASSIST IN ESTABLISHING NATIONAL CAPABILITIES FOR MONITORING PESTICIDE RESIDUES IN FOOD AND THE ENVIRONMENT			
13. FAO/IAEA symposium on changing perspectives in agrochemicals: isotopic techniques for the study of food and environmental implications (1987)			Proceedings, 1987
14. CRP on fate of persistent pesticides in the tropics, using isotope techniques (83-87)		Laboratory	1987
15. CRP on isotopic tracer-aided studies of pesticide residues in stored products (83-87)		As above	1987
16. CRP on the use of isotopes in studies of pesticide residues in rice-fish ecosystems (84-87)		As above	1987
17. CRP on radiotracer studies of fungicide residues in food plants (85-89)		As above	1989
18. CRP on biological activity and bioavailability of bound pesticide residues using nuclear techniques (86-91)			1991
19. CRP on the development and evaluation of controlled-release pesticide formulations to reduce residues and increase efficacy, using radioisotopes (83-87)		As above	1987
20. CRP on isotope-aided research on insect pheromones for pest management in developing countries (87-91)	AGM 86		1991
21. Technical report on formulation of pesticides	AGM 87/3		1988
22. Training course on monitoring pesticide residues (1987)	TC		1987
23. Agrochemicals Newsletter			Annual
24. Support for 10-15 TC projects and individual fellowships	TC	Laboratory	1987/88
PROJECT D.2.04: PREPARATION FOR THE COMMERCIAL USE OF FOOD IRRADIATION			
25. FAO/IAEA seminar for Africa on food irradiation (relates also to D.2.05) (1987)			Summary report, 1987
26. CRP-Asian regional project on food irradiation (85-89)	RCA	Laboratory	1989
27. CRP-Latin American regional project on food irradiation (ARCAL) (86-90)		As above	1990
28. Technical report on commercial use of food irradiation	AGM 88/2		1989
29. Annual training course (IFFIT)			1987/88
30. Support for about 15 TC projects and individual fellowships	TC		1987/88
31. Food Irradiation Newsletter			Quarterly

Table 94 (cont.) Task	Action or source	Services needed	Year of completion
32. CRP on irradiation to control food-borne parasites (87-91)			1991
33. Internal reports on the use of irradiation to control food-borne parasites	Consultants		1987/88
PROJECT D.2.05: ACCEPTANCE OF IRRADIATED FOOD IN TRADE			
34. FAO/IAEA conference on acceptance, control of and trade in irradiated foods (1988)			Proceedings, 1989
PROJECT D.2.06: USE OF IRRADIATION AS AN ALTERNATIVE TO FUMIGATION OF FOOD			
35. CRP on insect disinfestation by irradiation (83-87)			1987
36. CRP on irradiation as a quarantine treatment (85-89)			1989

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1987-88

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1987-88, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

		Table
1987		
1.	Advisory Group on biotechnological methods in plant breeding	93, No. 25
2.	Advisory Group on genetic methods in insect control	94, No. 9
3.	Advisory Group on formulation of pesticides	94, No. 21
1988		
1.	Advisory Group on ruminant nutrition	93, No. 38
2.	Advisory Group on commercial use of food irradiation	94, No. 28

DIVISION OF LIFE SCIENCES

ACTIONS PLANNED FOR 1987-88

Table 95

Area of Activity E.1 Nuclear Medicine

Task	Action or source	Services needed	Year of completion
PROJECT E.1.01: TO ESTABLISH AND STENGTHEN INDIGENOUS CAPABILITIES IN RELIABLE AND INEXPENSIVE PERFORMANCE OF ROUTINE IN VITRO ASSAYS			
1. Asia and Pacific regional project on thyroid-related hormones (RCA)	TC		1988
2. Latin American regional project on thyroid-related hormones (ARCAL)	TC		1989
3. Maintenance of software for data processing in RIA: internal and external QC	TC consultant		1989
4. CRP on external quality assessment of thyroid-related hormones (86-89)			1989
5. Train-the trainers course on RIA (Africa)	TC		1987
6. Support for 35-40 TC projects	TC		
PROJECT E.1.02: DEVELOPMENT OF IN VITRO NUCLEAR TECHNIQUES FOR THE DIAGNOSIS OF COMMUNICABLE DISEASES			
7. Seminar for Africa and the Middle East on nuclear techniques in parasitic infections (1987)			Summary report, 1987
8. Seminar for Asia and the Pacific on nuclear techniques in parasitic and communicable diseases (1988)			Summary report, 1988
9. CRP on the diagnosis of tuberculosis (87-90)	RCA		1990
10. CRP on the diagnosis of schistosomiasis (87-90)			1990
11. CRP on the monitoring of malaria vectors (84-88)			1988
12. Two training courses on nuclear techniques in communicable diseases (Asia and Africa)	TC		1987
13. Support for 2-5 TC projects	TC		
PROJECT E.1.03: TO OPTIMIZE AND APPLY NUCLEAR TECHNIQUES FOR THE SURVEY OF THYROID FUNCTION IN ENDEMIC GOITRE AREAS			
14. Internal report - Technical research protocol on nuclear techniques for survey of thyroid function in endemic goitre areas	AGM 87/1		1987
15. CRP on thyroid function in endemic goitre areas as related to prophylactic measures (87-90)			1990
PROJECT E.1.04: DEVELOPMENT OF INDIGENOUS NUCLEAR MEDICINE RESOURCES INCLUDING THE ACQUISITION OF INSTRUMENTATION AND SKILLS AND THE PRODUCTION OF REAGENTS			
16. Symposium on applications of dynamic functional studies with radioisotopes in nuclear medicine in developing countries (1988)			Proceedings, 1988
17. Seminar on training in nuclear medicine in developing countries (1988)			Summary report, 1988

Table 95 (cont.) Task	Action or source	Services needed	Year of completion
18. Technical document on training in nuclear medicine (detailing syllabus, lectures and clinical apprenticeship etc.)			1988
19. Annual interregional training course on nuclear medicine	TC		1987/88
20. Support for 20-25 TC projects	TC		
PROJECT E.1.05: DEVELOPMENT OF CAPABILITIES IN QUALITY CONTROL AND MAINTENANCE OF NUCLEAR MEDICINE EQUIPMENT			
21. CRP on quality control of nuclear medicine instruments for Latin America (84-87)			1987
22. CRP on quality control of nuclear medicine instruments for Asia and the Pacific (84-88)			1988
23. CRP on quality control of nuclear medicine instruments for Africa (87-90)			1990
24. CRP on quality control of liver imaging procedures (84-87)	RCA		1987
25. Technical document - Liver imaging atlas	RCA		1988
26. Development and dissemination of imaging software	Consultants		1989
27. Revision of technical document (issued in 1984) on QC of nuclear medicine instruments			1987
28. Two regional workshops on implementation of QC of nuclear medicine instruments	TC		1987/88
29. Support for 15-20 TC projects	TC		
PROJECT E.1.06: DEVELOPMENT OF NUCLEAR TECHNIQUES IN DYNAMIC STUDIES OF LUNG FUNCTION			
30. CRP on dynamic studies of lung function (87-90) (RCA)			1990
PROJECT E.1.07: ASSESSMENT OF THE STATUS AND COST-EFFECTIVENESS OF COMPETING RADIONUCLIDE AND NON-RADIONUCLIDE PROCEDURES FOR MEDICAL RESEARCH AND DIAGNOSIS IN DEVELOPING COUNTRIES			
31. Technical document - Assessment of cost-effectiveness of in vitro and in vivo nuclear and non-nuclear procedures	CMs 87 CRP 87-90 CRP 87-90		1990

Table 96

Area of Activity E.2 Applied Radiation Biology and Radiotherapy

Task	Action or source	Services needed	Year of completion
PROJECT E.2.01: ESTABLISHMENT OF SKILLS AND CAPABILITIES FOR RADIATION STERILIZATION OF MEDICAL SUPPLIES INCLUDING BIOLOGICAL TISSUE GRAFTS			
1. CRP on tissue graft sterilization and tissue banking for clinical use (RCA) (84-88)			1988
2. CRP on radiation sterilization practices suitable for local conditions in Africa and the Middle East (83-87)			1987

Table 96 (cont.) Task	Action or source	Services needed	Year of completion
3. Technical report - Revision of code of practice for radiation sterilization of medical supplies (last revision in 1974)	AGM 86		1987
4. Seminar on new approaches in the practices and process technology for radiation sterilization of medical supplies (1988)			Summary report, 1988
PROJECT E.2.02: ASSESSMENT OF THE POTENTIAL OF NUCLEAR TECHNIQUES TO IMPROVE FERMENTATION PROCESSING OF CASSAVA			
5. Internal report - Technical research protocol on improved fermentation techniques for cassava	AGM 87/2 CM 87		1987
6. CRP on improved fermentation techniques for cassava (jointly with RIFA) (86-89)		Laboratory	
PROJECT E.2.03: DEVELOPMENT OF SKILLS AND INFRASTRUCTURE NEEDED FOR INTRACAVITARY RADIOTHERAPY OF CANCER OF THE CERVIX			
7. Training course on intracavitary radiotherapy of cancer of the cervix for Asia and the Pacific	TC		1988
8. Support for 1-2 TC projects	TC		
PROJECT E.2.04: ASSESSMENT OF THE POTENTIAL OF INTRACAVITARY NEUTRON IRRADIATION AND COMBINED THERAPY			
Major Component A: Intracavitary Neutron Irradiation Therapy			
9. Research protocol on intracavitary neutron irradiation therapy	AGM 87/3		1987
10. CRP on intracavitary neutron irradiation therapy (86-89)			1989
11. Training course on intracavitary neutron irradiation therapy	TC		1988
Major Component B: Combined Therapy			
12. CRP on the collection and evaluation of recent data on combining radiation treatment with chemical and physical means (83-87)			1987
13. CRP on the collection and evaluation of recent data on combining radiation treatment with chemical and physical means in Asian countries (RCA) (83-87)			1987

Table 97

Area of Activity E.3 Radiation Dosimetry

Task	Action or source	Services needed	Year of completion
PROJECT E.3.01: DEVELOPMENT AND MONITORING OF THE SSDL NETWORK			
Major Component A: Development of SSDL Network			
1. Seminar for Asia and the Pacific on calibration procedures in SSDLs			Summary report, 1987
2. Symposium on dosimetry in radiotherapy (1987)			Proceedings, 1987

Table 97 (cont.) Task	Action or source	Services needed	Year of completion
3. Technical document - SSDL training manual on calibration of dosimeters	AGM 87/4		1988
4. 2-3 SSDL Circular Letters annually (in co-operation with WHO)			1987/88
5. CRP on the testing of the code of practice on absorbed dose determination in photon and electron beams (86-88)			1988
6. Development of equipment for SSDLs		Laboratory	Continuing
7. Interregional training course on dosimetry of radiotherapy and radiation protection			1988
8. Annual workshop on dose calibration	TC		1987/88
9. Support for 40-45 TC projects			
Major Component B: Monitoring of the SSDL Network			
10. Internal reports - Recommendations to the Secretariat on the operation and improvement of the SSDL Network	AGM 87/5 AGM 88/1		1987 1988
11. Annual dose intercomparison (20 SSDLs per year)			1987/88
PROJECT E.3.02: PROVISION OF DOSE INTERCOMPARISON AND ASSURANCE SERVICES			
Major Component A: Dose Intercomparison Service for Radiotherapy			
12. Dose intercomparisons using TLD (300 hospitals per year)		Laboratory	Continuing
13. Development of phantom for patient dose intercomparison (trial)		As above	1988
14. CRP on dose intercomparison for high-energy photons and electrons (86-89)			1989
15. CRP on performance testing of dosimetry equipment (87-89)		As above	1989
16. Development of equipment and methods for dose intercomparisons		As above	Continuing
Major Component B: Dose Assurance Service for Radiation Processing Facilities			
17. Technical document on dosimetry for quality control of radiation processing	AGM 88/2		1988
18. Internal report - Evaluation of electron high-dose intercomparison	CM 87		1987
19. Internal report on standardization of radiation processing dosimetry	CM 87		1987
20. Internal report on selection of electron reference dosimetry system	CM 88		1988
21. International dose assurance service (IDAS) (50-80 participants)	Sub-contract		Continuing
22. Development and intercomparison of high-dose electron reference dosimeters for IDAS	CRP 84-89		1988
23. Standardization of dosimetry techniques and quality control for radiation processing practices	CRP 87-90		1990
24. CRP on electron high-dose intercomparison for radiation processing (84-88)			1988
25. CRP on standard commissioning dosimetry procedure for radiation processing facilities (88-90)			1990

Table 98

Area of Activity E.4 Nutritional and Health-related Studies

Task	Action or source	Services needed	Year of completion
PROJECT E.4.01: TO ASSESS AND APPLY NUCLEAR ANALYTICAL TECHNIQUES IN SELECTED NUTRITIONAL RESEARCH AND TO DISSEMINATE RELEVANT INFORMATION TO DEVELOPING MEMBER STATES			
1. CRP on dietary intakes of nutritionally important trace elements (84-88)		Laboratory	1988
2. CRP to assess the role of isotope-aided human nutrition research in developing countries (86-90)		As above	1990
3. Technical document on radioactive isotopes in medical and nutritional research	CM 87		1987
4. Technical document on stable isotopes in medical and nutritional research	Seminar 86		1987
5. Training course on nuclear analytical methods in medical and nutritional research	TC		1988
6. Newsletter (see also E.4.02)			Semi-annually
7. Support for about 5 TC projects	TC		
PROJECT E.4.02: TO ASSESS AND APPLY NUCLEAR ANALYTICAL TECHNIQUES IN THE MONITORING OF SPECIFIC HEALTH-RELATED ENVIRONMENTAL POLLUTION			
8. CRP on the significance of hair mineral analysis for assessing internal body burdens of environmental mineral pollutants (84-88)		Laboratory	1988
9. CRP to assess the role of nuclear techniques for monitoring pollution from coal-fly ash and other industrial wastes (87-91)		As above	1991
10. CRP on the monitoring of compliance with regulations for toxic elements in foodstuffs, water and air (RCA) (86-90)		As above	1990
11. Technical report on nuclear techniques in occupational and environmental health studies	AGM 86		1987
12. Technical report - Laboratory training manual on nuclear techniques in health-related environmental monitoring and research	Consultants		1987
13. Training course on sampling, sample preparation and data evaluation in environmental and biomedical trace element analysis by nuclear and instrumental methods	TC		1987
14. Technical report on nuclear techniques in background air pollution monitoring	AGM 88/3		1989
15. Maintenance of database on analytical reference materials for environmental studies			Continuing
16. Newsletter (see also E.4.01)			Semi-annually
17. Support for about 5 TC projects	TC		
PROJECT E.4.03: SERVICES TO INTERNATIONAL POLLUTION MONITORING AND RESEARCH PROGRAMMES			
18. Analysis of rainwater and air filter samples from BAPMoN collection centres			Continuing
19. Development of analytical methods and procedures for air pollution monitoring		Seibersdorf Laboratory	1988
20. In-service training (about 20 trainees per year)		As above	Continuing

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1987-88

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1987-88, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

		Table
1987		
1.	Advisory Group on nuclear techniques for survey of thyroid function in endemic goitre areas	95, No. 14
2.	Advisory Group to evaluate new technical data for improved fermentation techniques for cassava	96, No. 5
3.	Advisory Group on protocol and formulation of a CRP on intracavitary radiotherapy with neutrons	96, No. 9
4.	Advisory Group on SSDL training manual	97, No. 3
5.	Advisory Group - SSDL Scientific Committee	97, No. 10
1988		
1.	Advisory Group - SSDL Scientific Committee	97, No. 10
2.	Advisory Group on dosimetry for quality control of radiation processing	97, No. 17
3.	Advisory Group on nuclear techniques in background air pollution monitoring	98, No. 14

DIVISION OF RESEARCH AND LABORATORIES

ACTIONS PLANNED FOR 1987-88

Table 99

Area of Activity F.1 Industrial Applications

Task	Action or source	Services needed	Year of completion
PROJECT F.1.01: ESTABLISHMENT OF BASIS FOR THE OPTIMAL UTILIZATION OF RADIATION AND ISOTOPE TECHNIQUES IN INDUSTRY			
1. Technical report on use of tracer techniques in solving problems in variable flow conditions	AGM 88/1		1988
2. CRP on nuclear techniques in the study of pollutant transport in the environment: interaction of solutes with geological media (methodological aspects) (86-89)			1989
3. CRP on the radiation modification of polymers for industrial and medical use (85-88)			1988
4. CRP on radiation damage to organic materials for nuclear reactors (85-88)	As above		1988
5. CRP on the radiographical evaluation of welds and castings (86-89)			1989
6. Technical report on tracer applications in process optimization	AGM 87/1		1987
7. Technical report on assessment of new developments and trends in radiation chemistry	AGM 88/2		1988
8. Technical report on radiation technology for biomass utilization and conversion	AGM 87/2		1987
9. Technical report on radiation treatment of stack gases	AGM 87/3		1987
PROJECT F.1.02: TECHNOLOGY TRANSFER OF THE INDUSTRIAL APPLICATIONS OF RADIATION AND ISOTOPES			
10. Two training courses per year on radiation technology and engineering and on non-destructive testing	TC		1987 1988
11. Ten training courses per year on radiation processing (3), nucleonic control systems (2) and non-destructive testing (5)	UNDP/RCA		1987 1988
12. Support for 50-70 TC projects	TC		1987/88
13. Seminar for Latin America on industrial radiation applications (1988)			Summary report, 1988

Table 100

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

Task	Action or source	Services needed	Year of completion
PROJECT F.2.01: EXCHANGE OF INFORMATION ON ISOTOPIC METHODS IN THE ASSESSMENT OF WATER RESOURCES			
1. Symposium on isotope hydrology in water resources development (1987)			Proceedings, 1987
2. Seminar for Latin America on the application of isotope techniques in hydrology (1987)			Summary report, 1987
3. Technical document on isotope hydrology investigations in arid and semi-arid regions	AGM 88/4		1988
4. Technical document on the application of isotope techniques in the study of the hydrology of fractured and fissured rocks	AGM 86		1987
5. CRP on the application of isotope techniques in hydrology in Latin America (83-87)		Laboratory	1987
6. CRP on the application of isotope and geochemical techniques in geothermal exploration in Latin America (83-87)		As above	1987
7. CRP on the dating of old groundwater (85-87)		As above	1987
8. Technical report on isotopes in geothermal exploration	CM 88		1988
PROJECT F.2.02: TECHNOLOGY TRANSFER IN THE USE OF NUCLEAR TECHNIQUES IN THE ASSESSMENT OF WATER RESOURCES			
9. Support for 40-50 TC projects		Laboratory	
PROJECT F.2.03: PROVISION OF ANALYTICAL AND INTERCALIBRATION SERVICES			
10. Execution of isotope analyses for various TC projects and CRPs in isotope hydrology and geochemistry		Laboratory	1987
11. Preparation and calibration of new isotope reference samples		As above	1987
12. Distribution of reference samples (about 200 per year) for intercalibration purposes		As above	Continuing
13. Determination and collection of isotopic data on precipitation samples of a global network (D, ^{18}O, T)		As above	Continuing
14. Internal report and technical notes on intercalibration and measurement of isotopes	CM 87,88		1987/88
PROJECT F.2.04: STUDY OF WATER RESOURCES IN AFRICA WITH EMPHASIS ON ARID AND SEMI-ARID ZONES			
15. Technical report on the feasibility of applying isotope techniques to arid zone hydrology investigations in various African countries	Consultants		1987
16. Support for 10-15 TC projects		Laboratory	

Table 100 (cont.) Task	Action or source	Services needed	Year of completion
PROJECT F.2.05: DISSEMINATION OF INFORMATION ON AND ASSESSMENT OF THE USE OF NUCLEAR TECHNIQUES IN THE DEVELOPMENT OF MINERAL RESOURCES			
17. CRP on borehole logging techniques for the determination of rock characteristics (85-89)			1989
18. CRP on the evaluation of nuclear techniques compared with traditional methods in soil-water studies (85-89)			1989
19. Technical report on technical and economic benefits of nuclear techniques in ore processing	AGM 88/3		1988
20. Technical report on current trends in nuclear borehole logging techniques for elemental analysis	CM 87		1987
21. Support for 10-15 TC projects	TC		1988

Table 101

Area of Activity G.1 Nuclear Measurements and Instrumentation

Task	Action or source	Services needed	Year of completion
PROJECT G.1.01: TO ASSIST DEVELOPING MEMBER STATES TO ESTABLISH CAPABILITIES AND INFRASTRUCTURES FOR THE PROPER USE AND MAINTENANCE OF NUCLEAR INSTRUMENTATION			
1. Technical report on nuclear science programmes in developing countries	AGM 86		1987
2. CRP on modular instruments in EUROcard system (83-87)			1987
3. Technical document-Manual on interfacing for nuclear experiments	CRP 83-88		1987
4. Technical document on small computers and their integration in nuclear studies	AGM 87/4		1987
5. CRP on nuclear solid state track detector studies of radon emission (86-88)			1988
6. Annual training course on nuclear electronics	TC		1987/88
7. Annual training course on interfacing in nuclear experiments	TC		1987/88
8. Training course on tube-exited X-ray analysis	TC		1987
9. Training course on Mössbauer spectroscopy	TC		1988
10. Development of software for X-ray analysis, Mössbauer spectroscopy and neutron activation analysis (three reports)	Research contracts		1987
11. Internal report on organization of regional instrumentation service	AGM 88/5		
12. Support for 110-120 TC projects	TC		1987/88
PROJECT G.1.02: DATA ASSESSMENT AND RESEARCH CO-ORDINATION			
13. Technical document on status and requirements of neutron source data	AGM 86		1987

Table 101 (cont.) Task	Action or source	Services needed	Year of completion
14. Technical document on status and requirements of nuclear data for fusion	AGM 86		1987
15. Technical document - Review of the nuclear data programme by INDC	TCM 87/5		1988
16. Technical document - INDC report on the data requirements for X-ray and proton-induced X-ray emission (PIXE) analysis	AGM 87/6		1988
17. Technical document on status and requirements of atomic data for fusion	AGM 87/7		1988
18. Technical document on status and requirements of nuclear data for radiation damage prediction and related safety aspects	AGM 88/6		1989
19. Technical document on topic to be determined by INDC	AGM 88/7		1989
20. Technical document - INDC report on the status and requirements of transactinium isotope decay data	SPM 87/8		1988
21. Technical document - INDC report on the status of nu-bar for fissile isotopes	CM 87		1988
22. Technical document - INDC report on the status of resonance parameters of transactinium isotopes	CM 88		1989
23. Technical report - Handbook on nuclear data for radioisotope production	CM 87		1988
24. Technical report - INDC report on the influence of samples and targets on nuclear data measurements	CM 88		1988
25. CRP on the measurement and analysis of (p,n) and (α,n) reaction cross-sections and of emission neutron spectra (86-88)			INDC reports 1987,1988
26. CRP on the calculation of structural material nuclear data (86-88)			INDC reports 1987, 1988
27. CRP on the measurement and analysis of 14 MeV neutron data needed for fission and fusion reactor technology (83-87)			Technical report, 1987
28. CRP on gamma-ray standards for detector calibration (86-87)			INDC report 1987, Tech. report, 1988
29. CRP on nuclear data for geophysics applications (87-89)			INDC reports 1987, 1988
30. CRP on the measurement and calculation of nuclear data for medical applications (87-89)			INDC reports 1987, 1988
31. CRP on the evaluation of fission yields (87-89)			INDC reports 1987, 1988
PROJECT G.1.03: COMPILATION, EVALUATION, EXCHANGE AND VALIDATION OF DATA			
32. Technical document - INDC report on the co-ordination of the international nuclear reaction data centre network	CM 87 SPM 88/8		1987 1988
33. Two technical documents - INDC reports on the co-ordination of the international atomic data centre network	CM 87 CM 88		1987 1988
34. Technical document - INDC report on the co-ordination of the international network of nuclear structure and decay data evaluators	CM 88		1988
35. Expansion of data base: compilation of experimental and evaluated nuclear reaction data		Data processing	Continuing

Table 101 (cont.) Task	Action or source	Services needed	Year of completion
36. Improvement of data base: conversion of files into a common format, testing of existing nuclear data and performance of benchmark testing of data		Data processing	Continuing
37. Data exchange: systematic exchange of nuclear and atomic reaction data in EXFOR format with co-operating data centres		As above	Continuing
38. Establishment of data base on nuclear data for safeguards applications		As above	1987
39. Technical report - Handbook on nuclear data for safeguards applications		As above	1987
40. Establishment of data base: nuclear data for medical applications		As above	1987/88
41. Upgrading of computer-based nuclear data file for INTOR neutronics calculations		As above	1987/88
42. Establishment of computer-based file of nuclear data for nuclear geophysics applications		As above	1987/88
43. Technical report - Handbook on nuclear data for nuclear geophysics applications		As above	1988
44. Establishment and maintenance of data base on evaluated atomic reaction data for fusion		As above	Continuing
45. Validation and intercomparison of different nuclear data bases and data processing codes		As above	Continuing
46. Software development and improvement for data processing		As above	Continuing
PROJECT G.1.04: PROVISION OF DATA CENTRE SERVICES AND TECHNOLOGY TRANSFER TO DEVELOPING COUNTRIES			
47. Provision of services: dissemination of nuclear and atomic data, data processing codes and associated documentation to scientists in Member States		Data processing	Continuing
48. Technical report - CINDA index to neutron data		As above	Annually
49. International Bulletin on Atomic and Molecular Data for Fusion		As above	Quarterly
50. Technical document - INDC report on progress in fission product nuclear data			Annually
51. Nuclear Data Newsletter			Semi-annually
52. Workshop on data and reactor physics applications (in co-operation with ICTP)		Data processing at ICTP	1987, 1988
53. Interregional training course on nuclear physics and nuclear data measurements with accelerators and reactors	TC		1987
54. Advanced interregional training course on material research with small accelerators	TC		1988
55. Interregional training course on preparation of nuclear data for use in reactor applications	TC		1988
56. Support for 15-20 TC projects (including one interregional project and in-house training of fellows)	TC		1987/88

Table 102

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: TO COLLECT, ANALYSE AND DISSEMINATE INFORMATION ON THE USE OF LOW-ENRICHED URANIUM INSTEAD OF HIGH-ENRICHED URANIUM			
1. Revision of technical report on physical properties and irradiation behaviour of LEU fuels	TCM 87/9		1988
2. Training course on core conversion calculations	TC		1988
3. Technical report on specifications and inspection techniques for research reactor plate type LEU fuels	TCM 88/9		1988
PROJECT G.3.02: TO PROVIDE PRACTICAL GUIDANCE TO DEVELOPING MEMBER STATES ON THE OPTIMAL UTILIZATION OF RESEARCH REACTORS AND PARTICLE ACCELERATORS			
4. Symposium on multi-purpose research reactors and related international co-operation (1987)			Proceedings, 1987
5. Maintenance of research reactor data base	Questionnaire	Data processing	Continuing
6. Development and testing of software for small computers for research reactor operators	CRP 84-87		1987
7. CRP on core management techniques to improve radioisotope production in research reactors (84-87)			1987
8. Training course on research reactor operation and use	TC		1987
9. Support for 30-40 TC projects	TC		1987/88

Table 103

Area of Activity G.4 Chemistry

Task	Action or source	Services needed	Year of completion
PROJECT G.4.01: PROVISION OF DIRECT ASSISTANCE IN ESTABLISHING CAPABILITIES FOR THE PRODUCTION AND QUALITY CONTROL OF RADIOPHARMACEUTICALS AND LABELLED COMPOUNDS AND IN THE APPLICATION OF NUCLEAR CHEMICAL TECHNIQUES AND CHEMISTRY IN NUCLEAR ENERGY			
1. Technical report on nuclear analytical techniques for on-line analysis in industry	AGM 87/10		1987
2. Technical report on target technology for cyclotron production of radionuclides	AGM 88/10		1988
3. Technical report on breeding materials for fusion reactors	TCM 87/11		1987
4. Technical report on the production of fission molybdenum for medical use	TCM 87/12		1987
5. Technical document - Volume 12 of Chemical Thermodynamics of Actinide Elements and Compounds			1987
6. Technical document - Volume 14 of Chemical Thermodynamics of Actinide Elements and Compounds	CM 87		1988

Table 103 (cont.) Task	Action or source	Services needed	Year of completion
7. CRP on the chemical and radiochemical separation and preconcentration of trace elements for mineral resources, industrial quality control and environmental research (86-89)			1989
8. Training course on cyclotron and reactor production of radionuclides	TC		1987
9. Two training courses on the preparation and control of radiopharmaceuticals	TC		1987/88
10. Two training courses on advanced nuclear analytical techniques	TC		1987/88
11. Training course on radionuclide generator technology	TC		1988
12. Support for 50-60 TC projects		Laboratory	
PROJECT G.4.02: PROVISION OF INTERCOMPARISON AND QUALITY CONTROL SERVICES TO CHECK THE VALIDITY OF ANALYTICAL PERFORMANCES			
13. Four analytical quality control intercomparisons and technical documents on results per year		As above	1987/88
14. Preparation and distribution of 30-50 reference materials (including 6-8 new ones) per year		As above	1987/88

Table 104

Area of Activity A.3 Advanced Systems and Technology Development

Task	Action or source	Services needed	Year of completion
PROJECT A.3.04: INTERNATIONAL TOKAMAK REACTOR STUDY			
1. Technical report-Phase II.A INTOR Workshop Report (Part 3)	TCM 87/13 TCM 88/11		1988
2. Technical report on demonstration reactor requirements	SPM 86		1987
PROJECT A.3.05: EXCHANGE OF INFORMATION ON FUSION RESEARCH AND ENGINEERING			
3. Twelfth International Conference on Plasma Physics and Controlled Nuclear Fusion Research (1988)	TCM 88/12		Proceedings, 1988
4. Technical report on stellarator approach to fusion	TCM 86		1987
5. Technical report on negative ion beam heating	TCM 87/14		1988
6. Technical report on plasma heating and current drive	TCM 87/15 TCM 88/13		1988
7. Technical document on toroidal confinement	TCM 87/16		1987
8. Technical document on disruptive instabilities	TCM 87/17		1987
9. Technical document on heavy ion fusion	TCM 88/14		1988
10. Technical document on large tokamaks	TCM 88/15		1988

Table 104 (a)*/
The role of the Agency's Laboratory in
Areas of Activity D, E, F and G

Area of Activity	Services provided
D. Food and Agriculture	Training will be provided for individual fellows (125 man-months for 46 fellows in 1985) 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 analysis of isotopes in connection with CRPs, the distribution of labelled fertilizers and pesticides and the provision of standardized reagents and RIA kits.
E. Human Health	The Dosimetry Laboratory serves as the co-ordinating laboratory for the IAEA/WHO Network of SSDLs. It will provide training, calibrate dosimeters for radiation protection and therapy and develop special equipment for use in SSDLs. Dose intercomparisons will be performed for 300 radiotherapy hospitals and 25 SSDLs each year. Support for CRPs will principally be in the form of analytical services. Rainwater and air filter samples will be analysed under the BAPMoN project and analytical methods will be developed for air pollution monitoring.
F. Industry and Earth Sciences	In the development of water and mineral resources, laboratory activities will focus on providing analytical services (^{3}H, ^{2}H, ^{18}O, ^{13}C, ^{14}C) for national institutes lacking analytical facilities. Reference samples will be prepared, calibrated and distributed to Member States.
G. Physical and Chemical Sciences	In instrument-related activities, prototypes for the IAEA-Eurocard Kit System will be tested and, if necessary, modified. In chemistry, training will be provided for individual fellows (45 man-months for 17 fellows in 1985). Four analytical quality control intercomparisons will be organized and 30-50 reference materials prepared and distributed each year.

*/ The work done by the Laboratory in connection with specific tasks has been referred to in Tables 93-104. For easy reference, the main forms of the Laboratory's contribution to the Areas of Activity indicated are summarized in this table.

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1987-1988

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1987-88, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

1987		Table
1.	Advisory Group on tracer applications in process optimization	99, No. 6
2.	Advisory Group on the use of radiation technology for biomass utilization and conversion	99, No. 8
3.	Advisory Group on radiation treatment of stack gases	99, No. 9
4.	Technical Committee on small computers and their integration in nuclear studies	101, No. 4
5.	Sixteenth Meeting of the International Nuclear Data Committee	101, No. 15
6.	Advisory Group on data requirements for X-ray and PIXE analysis	101, No. 16
7.	Advisory Group or status and requirements of atomic data for fusion	101, No. 17
8.	Specialists' meeting on the status and requirements of transactinium isotope decay data	101, No. 20
9.	Technical Committee on physical properties and irradiation behaviour of LEU fuels	102, No. 1
10.	Advisory Group on nuclear analytical techniques for on-line analysis in industry	103, No. 1
11.	Technical Committee on breeding materials for fusion reactors	103, No. 3
12.	Technical Committee on fission molybdenum for medical use	103, No. 4
13.	International Tokamak Reactor Workshop (2 meetings)	104, No. 1
14.	Technical Committee on negative ion beam heating	104, No. 5

1987		Table
15.	Technical Committee on plasma heating and current drive	104, No. 6
16.	Technical Committee on toroidal confinement	104, No. 7
17.	Technical Committee on disruptive instabilities	104, No. 8
1988		
1.	Advisory Group on the use of tracer techniques in solving problems in variable flow conditions	99, No. 1
2.	Advisory Group on assessment of new developments ad trends in radiation chemistry	99, No. 7
3.	Advisory Group on the technical and economic benefits of nuclear techniques in ore processing	100, No. 19
4.	Advisory Group on isotope hydrology investigations in arid and semi-arid regions	100, No. 3
5.	Advisory Group on organization of regional instrumentation service	101, No. 11
6.	Advisory Group on status and requirement of nuclear data for radiation damage prediction and related safety aspects	101, No. 18
7.	Advisory Group on topic to be determined by the INDC	101, No. 19
8.	Specialists' Meeting on co-ordination of the international nuclear reaction data centre network	101, No. 32
9.	Technical Committee on standardization of research reactor plate type LEU fuels	102, No. 3
10.	Advisory Group on target technology for cyclotron production of radionuclides	103, No. 2
11.	International Tokamak Reactor Workshop (2 meetings)	104, No. 1
12.	Technical Committee to select papers for the Twelfth International Conference on Plasma Physics and Controlled Nuclear Fusion Research	104, No. 3
13.	Technical Committee on plasma heating and current drive	104, No. 6
14.	Technical Committee on heavy ion fusion	104, No. 9
15.	Technical Committee on large tokamaks	104, No. 10

APPROPRIATION SECTION 4

OPERATIONAL FACILITIES

APPROPRIATION SECTION 4: OPERATIONAL FACILITIES

Summary of cost

Table 105

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	532 716	609 000	(11 000)	(1.8)	598 000	-	-	598 000	3.3	618 000	5.2	650 000
Consultants	14 966	12 900	300	2.3	13 200	-	-	13 200	6.5	14 000	6.5	15 000
Temporary assistance	26 542	12 600	300	2.4	12 900	-	-	12 900	5.0	13 500	5.0	14 200
Common staff costs	202 432	231 200	(7 000)	(3.0)	224 200	-	-	224 200	3.3	232 100	5.2	243 900
Equipment	111 885	48 600	19 400	39.9	68 000	2 000	2.9	70 000	4.0	70 700	4.0	75 700
Supplies	67 569	40 600	16 800	41.4	57 400	-	-	57 400	4.0	59 700	4.0	62 100
Scientific and technical contracts	6 000	34 000	3 000	8.8	37 000	10 000	27.0	47 000	4.1	38 000	4.1	51 000
Training	612	2 100	-	-	2 100	-	-	2 100	3.0	2 100	3.0	2 200
Hospitality	828	2 000	100	5.0	2 100	-	-	2 100	-	2 100	-	2 100
Travel	20 378	19 500	500	2.6	20 000	-	-	20 000	4.7	20 900	4.7	21 900
Common services	64 544	30 500	800	2.6	31 300	-	-	31 300	5.0	32 800	5.0	34 500
Non-shared transferred costs	96 000	103 000	-	-	103 000	-	-	103 000	4.2	107 000	5.1	113 000
Other	1 000 000	1 070 000	(26 200)	(2.4)	1 043 800	(1 000)	(0.1)	1 042 800	3.0	1 075 100	3.0	1 106 400
Sub-total: Direct costs	2 144 472	2 216 000	(3 000)	(0.1)	2 213 000	11 000	0.5	2 224 000	3.3	2 286 000	4.1	2 392 000
Contract administration services	3 482	3 000	-	-	3 000	-	-	3 000	3.4	3 000	4.3	3 000
Translation and records services	1 168	1 000	-	-	1 000	-	-	1 000	3.1	1 000	5.2	1 000
Printing and publishing services	12 701	70 000	-	-	70 000	-	-	70 000	4.6	73 000	5.0	77 000
Sub-total: Shared costs	17 351	74 000	-	-	74 000	-	-	74 000	4.1	77 000	5.1	81 000
T O T A L	2 161 823	2 290 000	(3 000)	(0.1) b/	2 287 000	11 000	0.5	2 298 000	3.3	2 363 000	4.2	2 473 000

a/ percentages as applied at the Area of Activity level

b/ On a comparable basis, this figure corresponds to zero growth. See Table 55 and the Introduction for further explanation.

APPROPRIATION SECTION 4: OPERATIONAL FACILITIES

Expenditure by Division

Table 106

Division	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
International Centre for Theoretical Physics	1 105 194	1 170 000	-	-	1 170 000	-	-	1 170 000	3.2	1 207 000	3.4	1 248 000
International Laboratory of Marine Radioactivity	1 056 629	1 120 000	(3 000)	(0.3)	1 117 000	11 000	1.0	1 128 000	3.5	1 156 000	4.9	1 225 000
Total Appropriation Section	2 161 823	2 290 000	(3 000)	(0.1)	2 287 000	11 000	0.5	2 298 000	3.3	2 363 000	4.2	2 473 000

Manpower by Division

Table 107

Division	1986 Adjusted P	GS	M&O	Total	1987 P	GS	M&O	Total	1988 a/ P	GS	M&O	Total
International Centre for Theoretical Physics	10	23	-	33	11	25	-	36	11	25	-	36
International Laboratory of Marine Radioactivity	9	15	-	24	9	15	-	24	9	15	-	24
Total Appropriation Section	19	38	-	57	20	40	-	60	20	40	-	60

a/ See Introduction, para 94

INTERNATIONAL LABORATORY OF MARINE RADIOACTIVITY

ACTIONS PLANNED FOR 1987-88

Table 108

Task	Action or source	Services needed	Year of completion
PROJECT C.2.05: TECHNICAL SUPPORT FOR MARINE RADIOACTIVITY MONITORING AND INVESTIGATION			
1. Development of methods for radionuclide measurements (emphasis on methods for ^{63}Ni, ^{129}I and others)		Neutron activation of samples	Continuing. (^{63}Ni and ^{129}I methods to be completed in 1989)
2. Analytical quality assurance service for radionuclide measurements in marine samples (2 intercalibration exercises per year)		Seibersdorf Laboratory	Completion of 3 exercises in 1987-88
3. In-service training in radionuclide measurements and tracer experiments (2 fellowships per year)	TC		
PROJECT C.2.06 DATA COLLECTION, EVALUATION AND RESEARCH ON RADIONUCLIDE INPUTS INTO THE MARINE ENVIRONMENT			
4. Assessment of processes controlling the vertical flux of radionuclides associated with particulate matter in the sea	National Science Foundation		Continuing. Results to be published in open literature
5. Study of bioaccumulation, transfer and transport of radionuclides through marine food chain			As above
6. Comparative studies of the fate of radionuclides released into different marine environments	EEC		As above
7. Study of behaviour of radionuclides in sediments and across water/sea bed interface			As above
8. Technical document on methods and strategies for monitoring radionculide releases in coastal marine environments	CRP 86-89		1989
9. Compilation and evaluation of input of radionuclides into the marine environment	CM		Technical document, 1988 (first phase)
PROJECT E.4.03: SERVICES TO INTERNATIONAL POLLUTION MONITORING AND RESEARCH PROGRAMMES			
10. Analysis of marine samples for UNEP collection centres		Monaco Laboratory	Continuing
11. Development and testing of reference analytical methods for specific marine pollutants		As above	As above
12. Intercalibration exercises for specific marine pollutants (12 per year)		As above	As above
13. In-service training for the analysis of specific marine pollutants (15 trainees per year)		As above	Continuing
14. Instrument maintenance services		As above	As above
15. Assisting Member States to obtain baseline data on the transport, fate and effects of specific marine pollutants	Consultants	As above	As above

APPROPRIATION SECTION 5

SAFEGUARDS

APPROPRIATION SECTION 5: SAFEGUARDS

Summary of cost

Table 109

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	13 492 673	14 634 000	333 000	2.3	14 967 000	200 000	1.3	15 167 000	2.7	15 371 000	5.1	16 371 000
Consultants	287 265	205 300	44 700	21.8	250 000	16 000	6.4	266 000	6.5	266 300	6.5	301 700
Overtime	3 440	8 900	(1 300)	(14.6)	7 600	-	-	7 600	5.0	8 000	5.0	8 500
Temporary assistance	321 636	41 600	(16 600)	(39.9)	25 000	-	-	25 000	5.0	26 600	5.0	27 500
Common staff costs	5 127 217	5 560 700	51 500	0.9	5 612 200	74 500	1.3	5 686 700	2.7	5 763 400	5.1	6 138 700
Equipment	2 921 726	3 691 800	(656 800)	(17.8)	3 035 000	(480 000)	(15.8)	2 555 000	4.0	3 156 400	4.0	2 763 500
Supplies	1 132 688	1 134 400	(400)	-	1 134 000	107 000	9.4	1 241 000	4.0	1 179 300	4.0	1 342 400
Scientific and technical contracts	608 443	570 000	190 000	33.3	760 000	75 000	9.9	835 000	4.1	791 000	4.1	905 000
Training	2 092	-	-	-	-	-	-	-	3.0	-	3.0	-
Conferences, symposia, seminars	39 984	122 000	(67 000)	(54.9)	55 000	90 000	163.6	145 000	2.3	56 000	2.3	152 000
Technical committees, advisory groups	74 820	139 000	62 000	44.6	201 000	(100 000)	(49.8)	101 000	2.3	206 000	2.3	106 000
Hospitality	13 741	13 900	300	2.2	14 200	2 000	14.1	16 200	-	14 200	-	16 200
Representation allowance	2 500	2 500	-	-	2 500	-	-	2 500	-	2 500	-	2 500
Travel	3 121 727	3 789 300	(328 800)	(8.7)	3 460 500	74 500	2.2	3 535 000	4.7	3 623 200	4.7	3 875 200
Common services	765 607	763 600	56 400	7.4	820 000	31 000	3.8	851 000	5.0	861 100	5.0	938 300
Non-shared transferred costs	1 409 000	1 506 000	64 000	4.2	1 570 000	100 000	6.4	1 670 000	4.2	1 636 000	5.1	1 829 000
Other	771	-	97 000	-	97 000	241 000	248.5	338 000	3.0	100 000	3.0	358 500
Sub-total: Direct costs	29 325 330	32 183 000	(172 000)	(0.5)	32 011 000	431 000	1.3	32 442 000	3.3	33 061 000	4.8	35 136 000
Contract administration services	12 935	17 000	-	-	17 000	-	-	17 000	3.4	18 000	4.3	18 000
Conference services	4 836	11 000	(3 000)	(27.3)	8 000	(1 000)	(12.5)	7 000	3.3	8 000	5.8	7 000
Translation and records services	193 805	190 000	(46 000)	(24.2)	144 000	2 000	1.4	146 000	3.1	148 000	5.2	157 000
Data processing services	1 404 099	1 137 000	163 000	14.3	1 300 000	(100 000)	(7.7)	1 200 000	3.4	1 347 000	4.3	1 294 000
Printing and publishing services	46 467	84 000	(43 000)	(51.2)	41 000	-	-	41 000	4.6	42 000	5.0	45 000
Sub-total: Shared costs	1 662 142	1 439 000	71 000	4.9	1 510 000	(99 000)	(6.6)	1 411 000	3.5	1 563 000	4.2	1 521 000
T O T A L	30 987 472	33 622 000	(101 000)	(0.3) b/	33 521 000	332 000	1.0	33 853 000	3.3	34 624 000	4.8	36 657 000

a/ percentages as applied at the Area of Activity level

b/ On a comparable basis, this figure corresponds to zero growth. See Table 55 and the Introduction for further explanation.

Expenditure by Division

Table 110

Division	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
Co-ordination Section	293 991	281 000	(29 000)	(10.3)	252 000	56 000	22.2	308 000	4.0	262 000	4.3	334 000
Operations A	6 066 760	7 016 000	(267 000)	(3.8)	6 749 000	59 000	0.9	6 808 000	3.2	6 966 000	5.0	7 378 000
Operations B	3 817 399	3 277 000	1 145 000	34.9	4 422 000	63 000	1.4	4 485 000	3.2	4 562 000	5.0	4 860 000
Operations C	5 011 386	6 265 000	(892 000)	(14.2)	5 373 000	59 000	1.1	5 432 000	3.1	5 539 000	5.0	5 882 000
Development and Technical Support	7 018 962	9 804 000	(665 000)	(6.8)	9 139 000	(355 000)	(3.9)	8 784 000	3.7	9 475 000	4.5	9 522 000
Safeguards Information Treatment	5 673 864	3 899 000	465 000	11.9	4 364 000	315 000	7.2	4 679 000	3.3	4 506 000	4.7	5 059 000
Safeguards Evaluation	1 582 045	1 676 000	54 000	3.2	1 730 000	52 000	3.0	1 782 000	2.8	1 779 000	5.0	1 924 000
Standardization, Training and Administrative Support	1 523 065	1 404 000	88 000	6.3	1 492 000	83 000	5.6	1 575 000	2.9	1 535 000	4.8	1 698 000
Total Appropriation Section	30 987 472	33 622 000	(101 000)	(0.3)	33 521 000	332 000	1.0	33 853 000	3.3	34 624 000	4.8	36 657 000

Manpower by Division

Table 111

Division	1986 Adjusted P	GS	M&O	Total	1987 P	GS	M&O	Total	1988 a/ P	GS	M&O	Total
Programme Co-ordination	1	2	-	3	1	2	-	3	1	2	-	3
Operations A	69	32	-	101	71	31	-	102	71	31	-	102
Operations B	47	26	-	73	49	27	-	76	49	27	-	76
Operations C	61	33	-	94	62	37	-	99	62	37	-	99
Development and Technical support	33	29	-	62	33	31	-	64	33	31	-	64
Safeguards Information Treatment	28	34	-	62	29	36	-	65	29	36	-	65
Safeguards Evaluation	21	14	-	35	21	15	-	36	21	15	-	36
Standardization, Training and Administrative Support	12	13	-	25	12	14	-	26	12	14	-	26
Total Appropriation Section	272	183	-	455	278	193	-	471	278	193	-	471

a/ See Introduction, para 94

D I V I S I O N O F D E V E L O P M E N T A N D T E C H N I C A L S U P P O R T

ACTIONS PLANNED FOR 1987-88

Table 112

Area of Activity J.3 Development and Technical Support

Task	Action or source	Services needed	Year of completion
ACTIVITY J.3.01: RESEARCH AND DEVELOPMENT			
1. Extension of the performance monitoring and control programme			First practical results in 1986. Continuing 1987-90
2. Development of measurement authentication techniques for new facilities			First practical results in 1985. Continuing beyond 1988
3. Development of new optical surveillance systems			1990
4. Installation, testing and evaluation of instrumentation for material balance and safeguards control data in a heavy water production plant			1989
5. Evaluation of techniques to be used in the limited frequency unannounced access safeguards approach for centrifuge uranium enrichment plants			1987
6. Testing and evaluation of instruments and procedures for away-from-reactor spent fuel storage ponds	AGM 87/2		1988
7. Optimization of resources used to develop, deploy and utilize calibration standards for NDA measurements	CM 87		Continuing
8. Development of criteria for specifying equipment that better meets the timeliness guidelines			1988
9. Development and testing of safeguards approaches based on advanced concepts and methods for new facility types, or aimed at increasing the efficiency of safeguards	CMs 87 AGM 87/3		First practical results in 1990
10. Updating of models for safeguarding different types of nuclear facility			Continuing
11. Development and testing of safeguards concepts and methods applicable to multiple facility nuclear fuel cycles	AGM 87/1 CM 87		First practical results in 1990
12. Preparation of forecast of amounts of nuclear material and of the number of facilities likely to be under safeguards			Continuing
13. Development, testing and implementation of safeguards effectiveness assessment methods			First practical results in 1990
14. Development of methodologies for optimizing the allocation of inspection effort at facility and State levels			1989

DIVISION OF SAFEGUARDS INFORMATION TREATMENT

ACTIONS PLANNED FOR 1987-88

Table 113

Area of Activity J.1 Safeguards Information Treatment

Task	Action or source	Services needed	Year of completion
ACTIVITY J.1.02: TO DEVELOP ISIS			
1. Review of ISIS and establishment of application plans and related system architecture to meet long-term information processing requirement			1987
2. Updating of elements of the ISIS system with respect to the INFCIRC/153-type nuclear material accounting system, including material transfers, to bring them into line with information needs for operational use		Data processing	Continuing
3. Development of computer support for INFCIRC/66-type nuclear material accounting and material-in-transit		As above	1987
4. Expansion of ISIS components pertaining to inspection reporting, including improved quality control, and the automated generation of statements and SIR information		As above	First practical results in 1988. Continuing beyond 1988
5. Development of improved computerized components to assist safeguards management		As above	Continuing

DIVISION OF SAFEGUARDS EVALUATION

ACTIONS PLANNED FOR 1987-88

Table 114

Area of Activity J.4 Safeguards Evaluation

Task	Action or source	Services needed	Year of completion
ACTIVITY J.4.02: TO DEVELOP EVALUATION METHODS			
1. Further development of the long-term criteria of the Department and major improvements in the methods of reporting the results of inspection, including the production of statements			Continuing
2. Improvement of statistical techniques as regards both data analysis and the development of sampling plans	CM 87		First practical results in 1986. Continuing beyond 1988
3. Evaluation of NDA techniques in order to improve equipment performance	AGM 88/1 CM 87		First practical results in 1987. Continuing beyond 1988

Table 114 (cont.) Task	Action or source	Services needed	Year of completion
4. Improvement of the quality control of instrument measurement methods	AGM 87/5 AGM 88/1 CM 87		First practical results in 1986. Continuing beyond 1988
5. Further development of isotopic correlation techniques for the verification of fuel reprocessing plant inputs by comparing field test results with theoretical predictions		Data processing	1988
6. Further testing of safeguards effectiveness assessment methods by analysing inspection results from power reactors, fuel fabrication plants, reprocessing plants and other facilities	AGM 87/4 CM 88		First practical results in 1986. Continuing beyond 1988
7. Further development and assessment of tank calibration procedures to reduce levels of systematic and random errors			First practical results in 1988

TECHNICAL COMMITTEES, ADVISORY GROUPS AND SPECIALISTS' MEETINGS IN 1987-1988

Within the limits of the appropriation and subject to the requirements of the programme as outlined for 1987-88, it is planned to hold the meetings listed below. The reference following each meeting is to the relevant table of planned actions given above.

1987		Table
1.	Advisory Group on safeguards application for multiple facility fuel cycles	112, No. 11
2.	Advisory Group on NDA of spent fuel	112, No. 6
3.	Advisory Group on application of safeguards at reprocessing plants	112, No. 9
4.	Advisory Group on safeguards effectiveness assessment methods	114, No. 6
5.	Advisory Group on quality of safeguards analytical measurements	114, No. 4
6.	SAGSI (two meetings)	

1988		
1.	Advisory Group on quality of safeguards NDA measurement data	114, Nos 3, 4
2.	SAGSI (two meetings)	

APPROPRIATION SECTION 6

POLICY-MAKING ORGANS

APPROPRIATION SECTION 6: POLICY-MAKING ORGANS

Summary of cost

Table 115

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	191 804	196 000	(3 000)	(1.5)	193 000	-	-	193 000	2.6	198 000	5.1	208 000
Overtime	35 514	29 500	500	1.7	30 000	-	-	30 000	5.0	31 500	5.0	33 100
Temporary assistance	10 227	12 700	(700)	(5.5)	12 000	-	-	12 000	5.0	12 600	5.0	13 300
Common staff costs	72 885	73 500	(1 500)	(2.0)	72 000	-	-	72 000	2.6	73 700	5.1	78 000
Equipment	758	-	-	-	-	-	-	-	4.0	-	4.0	-
Supplies	1 647	3 100	(100)	(3.2)	3 000	-	-	3 000	4.0	3 100	4.0	3 300
Conferences, symposia, seminars	212 620	324 000	(25 000)	(7.7)	299 000	-	-	299 000	3.2	308 000	4.9	324 000
Hospitality	7 425	7 000	-	-	7 000	-	-	7 000	-	7 000	-	7 000
Travel	1 198	5 100	(100)	(2.0)	5 000	-	-	5 000	4.7	5 200	4.7	5 500
Common services	44 415	44 100	900	2.0	45 000	-	-	45 000	5.0	47 300	5.0	49 600
Other	89 054	80 000	6 000	7.5	86 000	-	-	86 000	3.0	88 600	3.0	91 200
Sub-total: Direct costs	667 547	775 000	(23 000)	(3.0)	752 000	-	-	752 000	3.1	775 000	4.9	813 000
Conference services	141 363	169 000	(3 000)	(1.8)	166 000	-	-	166 000	3.3	176 000	5.8	183 000
Translation and records services	1 905 822	2 458 000	(20 000)	(0.8)	2 438 000	20 000	0.8	2 458 000	3.1	2 519 000	5.2	2 666 000
Data processing services	1 016	-	-	-	-	-	-	-	3.4	-	4.3	-
Printing and publishing services	219 825	324 000	1 000	0.3	325 000	-	-	325 000	4.6	339 000	5.0	359 000
Sub-total: Shared costs	2 268 026	2 951 000	(22 000)	(0.7)	2 929 000	20 000	0.7	2 949 000	3.6	3 034 000	5.0	3 208 000
T O T A L	2 935 573	3 726 000	(45 000)	(1.2) b/	3 681 000	20 000	0.5	3 701 000	3.5	3 809 000	5.0	4 021 000

a/ percentages as applied at the Area of Activity level

b/ On a comparable basis, this figure corresponds to a 0.9% reduction. See Table 55 and the Introduction for further explanation.

APPROPRIATION SECTION 6: POLICY-MAKING ORGANS

Expenditure

Table 116

	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
The General Conference	1 205 448	1 374 000	113 000	8.2	1 487 000	-	-	1 487 000	3.3	1 536 000	5.1	1 614 000
The Board of Governors	1 730 125	2 352 000	(158 000)	(6.7)	2 194 000	20 000	0.9	2 214 000	3.6	2 273 000	4.9	2 407 000
Total Appropriation Section	2 935 573	3 726 000	(45 000)	(1.2)	3 681 000	20 000	0.5	3 701 000	3.5	3 809 000	5.0	4 021 000

Summary of manpower

Table 117

	1986 Adjusted				1987				1988 a/			
	P	GS	M&O	Total	P	GS	M&O	Total	P	GS	M&O	Total
Policy-making Organs	3	2	-	5	3	2	-	5	3	2	-	5

a/ See Introduction, para 94

APPROPRIATION SECTION 7

EXECUTIVE MANAGEMENT AND ADMINISTRATION

APPROPRIATION SECTION 7: EXECUTIVE MANAGEMENT AND ADMINISTRATION

Summary of cost

Table 118

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	4 857 431	5 304 000	82 000	1.5	5 386 000	1 000	-	5 387 000	3.3	5 562 000	5.2	5 852 000
Consultants	183 042	142 700	(9 900)	(6.9)	132 800	100	0.1	132 900	6.5	141 600	6.5	150 600
Overtime	32 397	31 300	(4 300)	(13.7)	27 000	-	-	27 000	5.0	28 400	5.0	29 800
Temporary assistance	152 666	73 000	(11 600)	(15.9)	61 400	-	-	61 400	5.0	64 500	5.0	67 700
Common staff costs	1 845 824	2 015 900	3 800	0.2	2 019 700	1 100	0.1	2 020 800	3.3	2 086 100	5.2	2 195 600
Equipment	197 382	33 500	25 600	76.4	59 100	400	0.7	59 500	4.0	61 500	4.0	64 300
Supplies	39 790	21 800	(1 300)	(6.0)	20 500	-	-	20 500	4.0	21 300	4.0	22 100
Training	257 664	409 400	173 500	42.4	582 900	-	-	582 900	3.0	600 400	3.0	618 400
Conferences, symposia, seminars	14 350	-	10 000	-	10 000	20 000	200.0	30 000	2.3	10 000	2.3	31 000
Technical committees, advisory groups	54 866	46 000	9 000	19.6	55 000	-	-	55 000	2.3	56 000	2.3	58 000
Hospitality	4 365	17 700	(300)	(1.7)	17 400	-	-	17 400	-	17 400	-	17 400
Representation allowance	27 394	27 500	-	-	27 500	-	-	27 500	-	27 500	-	27 500
Travel	144 970	223 700	60 300	27.0	284 000	5 000	1.8	289 000	4.7	297 200	4.7	316 900
Common services	170 870	208 800	43 700	20.9	252 500	5 000	2.0	257 500	5.0	265 100	5.0	283 900
Non-shared transferred costs	(318 000)	(331 000)	-	-	(331 000)	-	-	(331 000)	4.2	(344 000)	5.1	(362 000)
Other	-	174 700	(117 500)	(67.3)	57 200	11 400	19.9	68 600	3.0	59 000	3.0	72 800
Sub-total: Direct costs	7 665 011	8 399 000	263 000	3.1	8 662 000	44 000	0.5	8 706 000	3.4	8 954 000	4.9	9 446 000
Conference services	7 445	1 000	-	-	1 000	-	-	1 000	3.3	1 000	5.8	1 000
Translation and records services	482 711	493 000	(24 000)	(4.9)	469 000	13 000	2.8	482 000	3.1	484 000	5.2	522 000
Medical services	304 478	355 000	(2 000)	(0.6)	353 000	-	-	353 000	4.0	367 000	5.1	386 000
Data processing services	657 602	526 000	106 000	20.2	632 000	44 000	7.0	676 000	3.4	653 000	4.3	730 000
Printing and publishing services	389 756	476 000	(93 000)	(19.5)	383 000	4 000	1.0	387 000	4.6	400 000	5.0	424 000
Sub-total: Shared costs	1 841 992	1 851 000	(13 000)	(0.7)	1 838 000	61 000	3.3	1 899 000	3.6	1 905 000	4.9	2 063 000
T O T A L	9 507 003	10 250 000	250 000	2.4 b/	10 500 000	105 000	1.0	10 605 000	3.4	10 859 000	5.0	11 509 000

a/ percentages as applied at the Area of Activity level

b/ On a comparable basis, this figure corresponds to zero growth. See Table 55 and the Introduction for further explanation.

APPROPRIATION SECTION 7: EXECUTIVE MANAGEMENT AND ADMINISTRATION

Expenditure

Table 119

	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase %	1987 with price increase	Price increase %	1988 with price increase
Executive Management	1 681 561	1 870 000	(50 000)	(2.7)	1 820 000	1 000	0.1	1 821 000	2.9	1 873 000	4.9	1 966 000
Administration	7 825 442	8 380 000	300 000	3.6	8 680 000	104 000	1.2	8 784 000	3.5	8 986 000	5.0	9 543 000
Total Appropriation Section	9 507 003	10 250 000	250 000	2.4	10 500 000	105 000	1.0	10 605 000	3.4	10 859 000	5.0	11 509 000

Manpower

Table 120

	1986 Adjusted				1987				1988 a/			
	P	GS	M&O	Total	P	GS	M&O	Total	P	GS	M&O	Total
Executive management	16	13	-	29	16	13	-	29	16	13	-	29
Administration	61	97	-	158	61	99	-	160	61	99	-	160
Total Appropriation Section	77	110	-	187	77	112	-	189	77	112	-	189

a/ See Introduction, para 94

APPROPRIATION SECTION 8

GENERAL SERVICES

APPROPRIATION SECTION 8: GENERAL SERVICES

Summary of cost

Table 121

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	1 752 284	1 927 000	-	-	1 927 000	-	-	1 927 000	4.8	2 019 000	5.4	2 129 000
Overtime	14 096	15 800	1 700	10.8	17 500	200	1.1	17 700	5.0	18 400	5.0	19 500
Temporary assistance	34 757	64 100	(9 100)	(14.2)	55 000	3 000	5.5	58 000	5.0	57 800	5.0	63 900
Common staff costs	665 868	733 000	(10 000)	(1.4)	723 000	(700)	(0.1)	722 300	4.8	758 100	5.4	798 300
Equipment	306 360	226 000	6 000	2.7	232 000	35 000	15.1	267 000	4.0	241 300	4.0	288 800
Supplies	767 543	615 000	(14 000)	(2.3)	601 000	34 000	5.7	635 000	4.0	625 000	4.0	686 800
Hospitality	208	500	-	-	500	-	-	500	-	500	-	500
Travel	2 767	4 600	400	8.7	5 000	500	10.0	5 500	4.7	5 200	4.7	6 000
Common services	6 123 445	6 283 000	8 000	0.1	6 291 000	18 000	0.3	6 309 000	4.2	6 554 700	4.2	6 850 200
Sub-total: Direct costs	9 667 328	9 869 000	(17 000)	(0.2)	9 852 000	90 000	0.9	9 942 000	4.3	10 280 000	4.6	10 843 000
Translation and records services	2 629	4 000	-	-	4 000	-	-	4 000	3.1	4 000	5.2	4 000
Data processing services	68 176	66 000	4 000	6.1	70 000	5 000	7.1	75 000	3.4	72 000	4.3	81 000
Printing and publishing services	55 337	42 000	1 000	2.4	43 000	5 000	11.6	48 000	4.6	45 000	5.0	53 000
Sub-total: Shared costs	126 142	112 000	5 000	4.5	117 000	10 000	8.5	127 000	3.4	121 000	5.1	138 000
T O T A L	9 793 470	9 981 000	(12 000)	(0.1) b/	9 969 000	100 000	1.0	10 069 000	4.3	10 401 000	4.6	10 981 000

a/ percentages as applied at the Area of Activity level

b/ On a comparable basis, this figure corresponds to zero growth. See Table 55 and the Introduction for further explanation.

APPROPRIATION SECTION 8: GENERAL SERVICES

Summary of manpower

Table 122

	1986 Adjusted				1987				1988 a/			
	P	GS	M&O	Total	P	GS	M&O	Total	P	GS	M&O	Total
General Services	10	71	26	107	10	71	26	107	10	71	26	107

a/ See Introduction, para 94

VIC Operating Costs

Table 123

	1985 Actual expenditures	1986 Adjusted budget	1987 estimate	1988 estimate
Utilities	1 612 798	1 660 000	1 734 000	1 816 000
Contractual maintenance services	696 435	730 000	815 000	805 000
Cleaning	724 078	748 000	762 700	790 000
Building and maintenance staff	1 147 199	1 173 000	1 160 000	1 213 000
Security services staff costs	751 035	750 000	802 000	834 800
Building and maintenance supplies	351 318	313 000	306 800	340 700
Building, property and maintenance equipment	82 736	95 700	90 500	97 500
Sinking Fund, major repairs	94 500	33 300	52 000	81 000
TOTAL	5 460 099	5 503 000	5 723 000	5 978 000

Costs of common services, supplies and equipment

Table 124

	1985 Actual expenditures	1986 Adjusted budget	1987 estimate	1988 estimate
Division of General Services				
A. Services:				
Communications	767 868	770 000	809 000	882 000
Freight and Transportation	30 802	30 000	31 000	35 400
Rental of Premises	44 004	50 000	53 000	55 000
Rental and maintenance of office equipment	300 271	322 000	335 000	364 000
Other	48 955	50 000	53 000	55 000
Sub-total	1 191 900	1 222 000	1 281 000	1 391 400
B. Supplies:				
Office supplies	207 355	163 000	173 000	189 000
Expendable equipment	208 870	139 000	145 200	157 100
Other				
Sub-total	416 225	302 000	318 200	346 100
C. Equipment:				
Office furniture and equipment	111 764	73 000	78 000	87 000
Transportation and equipment	17 360	24 000	20 800	23 300
Sub-total	129 124	97 000	98 800	110 300
TOTAL	1 737 249	1 621 000	1 698 000	1 847 800

APPROPRIATION SECTION 9

SHARED SUPPORT SERVICES

(COST OF WORK FOR OTHERS)

APPROPRIATION SECTION 9: SHARED SUPPORT SERVICES

Summary of cost

Table 125

Item of Expenditure	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Salaries for established posts	8 132 165	9 070 400	(323 400)	(3.6)	8 747 000	84 000	1.0	8 831 000	3.5	9 054 000	5.3	9 628 000
Consultants	239	7 300	2 700	37.0	10 000	-	-	10 000	6.5	10 600	6.5	11 400
Overtime	119 335	33 100	600	1.8	33 700	-	-	33 700	5.0	35 400	5.0	37 200
Temporary assistance	619 113	920 100	(113 400)	(12.3)	806 700	(26 000)	(3.2)	780 700	5.0	847 200	5.0	860 700
Common staff costs	2 987 992	3 445 800	(165 000)	(4.8)	3 280 800	31 000	0.9	3 311 800	3.5	3 398 500	5.3	3 613 400
Equipment	1 839 454	930 200	(41 600)	(4.5)	888 600	(337 000)	(37.9)	551 600	4.0	924 200	4.0	596 700
Supplies	1 786 991	1 707 200	(50 300)	(2.9)	1 656 900	113 700	6.9	1 770 600	4.0	1 723 200	4.0	1 915 200
Scientific and technical contracts	294 983	216 800	(5 800)	(2.7)	211 000	-	-	211 000	4.1	220 000	4.1	228 000
Training	62 588	62 400	1 900	3.0	64 300	-	-	64 300	3.0	66 300	3.0	68 200
Hospitality	366	1 700	-	-	1 700	-	-	1 700	-	1 700	-	1 700
Travel	32 741	39 900	(4 400)	(11.0)	35 500	-	-	35 500	4.7	37 100	4.7	39 000
Common services	2 035 822	2 204 600	217 200	9.9	2 421 800	147 000	6.1	2 568 800	3.7	2 511 800	3.7	2 761 300
Other	-	36 500	(36 500)	(100.0)	-	15 300	-	15 300	3.0	-	3.0	16 200
Sub-total: Direct costs	17 911 789	18 676 000	(518 000)	(2.8)	18 158 000	28 000	0.2	18 186 000	3.7	18 830 000	4.9	19 777 000
Translation and records services	47 210	35 000	4 000	11.4	39 000	-	-	39 000	3.1	40 000	5.2	42 000
Data processing services	339 663	394 000	128 000	32.5	522 000	12 000	2.3	534 000	3.4	539 000	4.3	575 000
Printing and publishing services	60 529	62 000	16 000	25.8	78 000	(2 000)	(2.6)	76 000	4.6	80 000	5.0	83 000
Sub-total: Shared costs	447 402	491 000	148 000	30.1	639 000	10 000	1.6	649 000	3.1	659 000	4.6	700 000
SUB-TOTAL	18 359 191	19 167 000	(370 000)	(1.9)	18 797 000	38 000	0.2	18 835 000	3.7	19 489 000	4.8	20 477 000
Less: Cross-Charge (above)	447 402	491 000	148 000	30.1	639 000	10 000	1.6	649 000	3.1	659 000	4.6	700 000
Charge to Agency meetings	601 042	840 000	(114 000)	(13.6)	726 000	10 000	1.4	736 000	3.2	749 000	4.9	797 000
Total Shared Support Services	17 310 747	17 836 000	(404 000)	(2.3)	17 432 000	18 000	0.1	17 450 000	3.7	18 081 000	4.9	18 980 000
Less: Agency's share	13 523 772	14 132 000	5 000	-	14 137 000	(6 000)	-	14 131 000	3.7	14 656 000	4.9	15 367 000
Cost of work for others	3 786 975	3 704 000	(409 000)	(11.0)	3 295 000	24 000	0.7	3 319 000	3.9	3 425 000	4.8	3 613 000

a/ percentages as applied at the Area of Activity level

APPROPRIATION SECTION 9: SHARED SUPPORT SERVICES

Expenditure by service

Table 126

Service	1985 Actual expenditures	1986 Budget	Expenditure increase(decrease)	%	1987 at 1986 prices	Expenditure increase(decrease)	%	1988 at 1986 prices	Price increase % a/	1987 with price increase	Price increase % a/	1988 with price increase
Contract administration services	318 651	361 000	24 000	6.6	385 000	12 000	3.1	397 000	3.4	398 000	4.3	428 000
Conference services	469 439	487 000	(7 000)	(1.4)	480 000	6 000	1.3	486 000	3.3	496 000	5.8	531 000
Translation and records services	3 684 913	4 205 000	(138 000)	(3.3)	4 067 000	(1 000)	-	4 066 000	3.1	4 193 000	5.2	4 408 000
Medical services	673 692	755 000	(2 000)	(0.3)	753 000	-	-	753 000	4.0	783 000	5.1	824 000
Library	1 562 144	1 619 000	95 000	5.9	1 714 000	5 000	0.3	1 719 000	3.6	1 776 000	4.9	1 867 000
Data processing services	5 451 060	5 216 000	46 000	0.9	5 262 000	(27 000)	(0.5)	5 235 000	3.4	5 439 000	4.3	5 646 000
Printing and publishing	5 598 250	5 684 000	(274 000)	(4.8)	5 410 000	33 000	0.6	5 443 000	4.5	5 655 000	5.1	5 976 000
Interpretation	601 042	840 000	(114 000)	(13.6)	726 000	10 000	1.4	736 000	3.2	749 000	4.9	797 000
SUB-TOTAL	18 359 191	19 167 000	(370 000)	(1.9)	18 797 000	38 000	0.2	18 835 000	3.7	19 489 000	4.8	20 477 000
Less: cross-charge (above)	447 402	491 000	148 000	30.1	639 000	10 000	1.6	649 000	3.1	659 000	4.6	700 000
charge to Agency meetings	601 042	840 000	(114 000)	(13.6)	726 000	10 000	1.4	736 000	3.2	749 000	4.9	797 000
Total Shared Support Services	17 310 747	17 836 000	(404 000)	(2.3)	17 432 000	18 000	0.1	17 450 000	3.7	18 081 000	4.9	18 980 000
Less: Agency's share	13 523 772	14 132 000	5 000	-	14 137 000	(6 000)	-	14 131 000	3.7	14 656 000	4.9	15 367 000
Services provided to others	3 786 975	3 704 000	(409 000)	(11.0)	3 295 000	24 000	0.7	3 319 000	3.9	3 425 000	4.8	3 613 000

a/ percentages as applied at the Area of Activity level

BREAKDOWN OF COSTS BY USER - 1987

Table 127

	Contract administration services	Conference services	Translation and records services	Medical services	Library	Data processing services	Printing and publishing services	Interpretation	Total	%
Agency										
Appropriation Section 1	-	-	331 000	-	-	599 000	41 000		971 000	6.3
Appropriation Section 2	70 000	187 000	423 000	-	979 000	1 032 000	2 520 000		5 211 000	34.0
Appropriation Section 3	307 000	124 000	243 000	-	-	198 000	902 000		1 774 000	11.6
Appropriation Section 4	3 000	-	1 000	-	-	-	73 000		77 000	0.5
Appropriation Section 5	18 000	8 000	148 000	-	-	1 347 000	42 000		1 563 000	10.2
Appropriation Section 6	-	176 000	2 519 000	-	-	-	339 000	[308 000]	3 034 000	19.9
Appropriation Section 7	-	1 000	484 000	367 000	-	653 000	400 000		1 905 000	12.4
Appropriation Section 8	-	-	4 000	-	-	72 000	45 000		121 000	0.8
Appropriation Section 9	-	-	40 000	-	-	539 000	80 000		659 000	4.3
Meetings in various Appropriation Sections								[441 000]	-	
Sub-Total	398 000	496 000	4 193 000	367 000	979 000	4 440 000	4 442 000	[749 000]	15 315 000	100.0
Less: Cross-charges	-	-	40 000	-	-	539 000	80 000	-	659 000	
Sub-Total Agency	398 000	496 000	4 153 000	367 000	979 000	3 901 000	4 362 000	[749 000]	14 656 000	
Work for others										
UN/UNIDO				380 000	787 000	721 000	1 213 000		3 101 000	
UNRWA				36 000	10 000	57 000	-		103 000	
AGRIS				-	-	130 000	-		130 000	
UNPA				-	-	31 000	-		31 000	
Other				-	-	60 000	-		60 000	
Sub-Total Work for Others				416 000	797 000	999 000	1 213 000		3 425 000	
GRAND TOTAL	398 000	496 000	4 153 000	783 000	1 776 000	4 900 000	5 575 000	[749 000]	18 081 000	

BREAKDOWN OF COSTS BY USER - 1988

Table 128

	Contract administration services	Conference services	Translation and records services	Medical services	Library	Data processing services	Printing and publishing services	Interpretation	Total	%
Agency										
Appropriation Section 1	-	-	352 000	-	-	624 000	38 000		1 014 000	6.3
Appropriation Section 2	72 000	210 000	404 000	-	1 028 000	1 080 000	2 677 000		5 471 000	34.0
Appropriation Section 3	335 000	130 000	260 000	-	-	209 000	937 000		1 871 000	11.6
Appropriation Section 4	3 000	-	1 000	-	-	-	77 000		81 000	0.5
Appropriation Section 5	18 000	7 000	157 000	-	-	1 294 000	45 000		1 521 000	9.5
Appropriation Section 6	-	183 000	2 666 000	-	-	-	359 000	[324 000]	3 208 000	20.0
Appropriation Section 7	-	1 000	522 000	386 000	-	730 000	424 000		2 063 000	12.8
Appropriation Section 8	-	-	4 000	-	-	81 000	53 000		138 000	0.9
Appropriation Section 9	-	-	42 000	-	-	575 000	83 000		700 000	4.4
Meetings in various Appropriation Sections								[473 000]	-	
Sub-Total	428 000	531 000	4 408 000	386 000	1 028 000	4 593 000	4 693 000	[797 000]	16 067 000	100.0
Less: Cross-charges	-	-	42 000	-	-	575 000	83 000	-	700 000	
Sub-Total Agency	428 000	531 000	4 366 000	386 000	1 028 000	4 018 000	4 610 000	[797 000]	15 367 000	
Work for others										
UN/UNIDO				399 000	828 000	758 000	1 283 000		3 268 000	
UNRWA				39 000	11 000	61 000	-		111 000	
AGRIS				-	-	138 000	-		138 000	
UNPA				-	-	32 000	-		32 000	
Other				-	-	64 000	-		64 000	
Sub-Total Work for Others				438 000	839 000	1 053 000	1 283 000		3 613 000	
GRAND TOTAL	428 000	531 000	4 366 000	824 000	1 867 000	5 071 000	5 893 000	[797 000]	18 980 000	

APPROPRIATION SECTION 9: SHARED SUPPORT SERVICES

Manpower by service

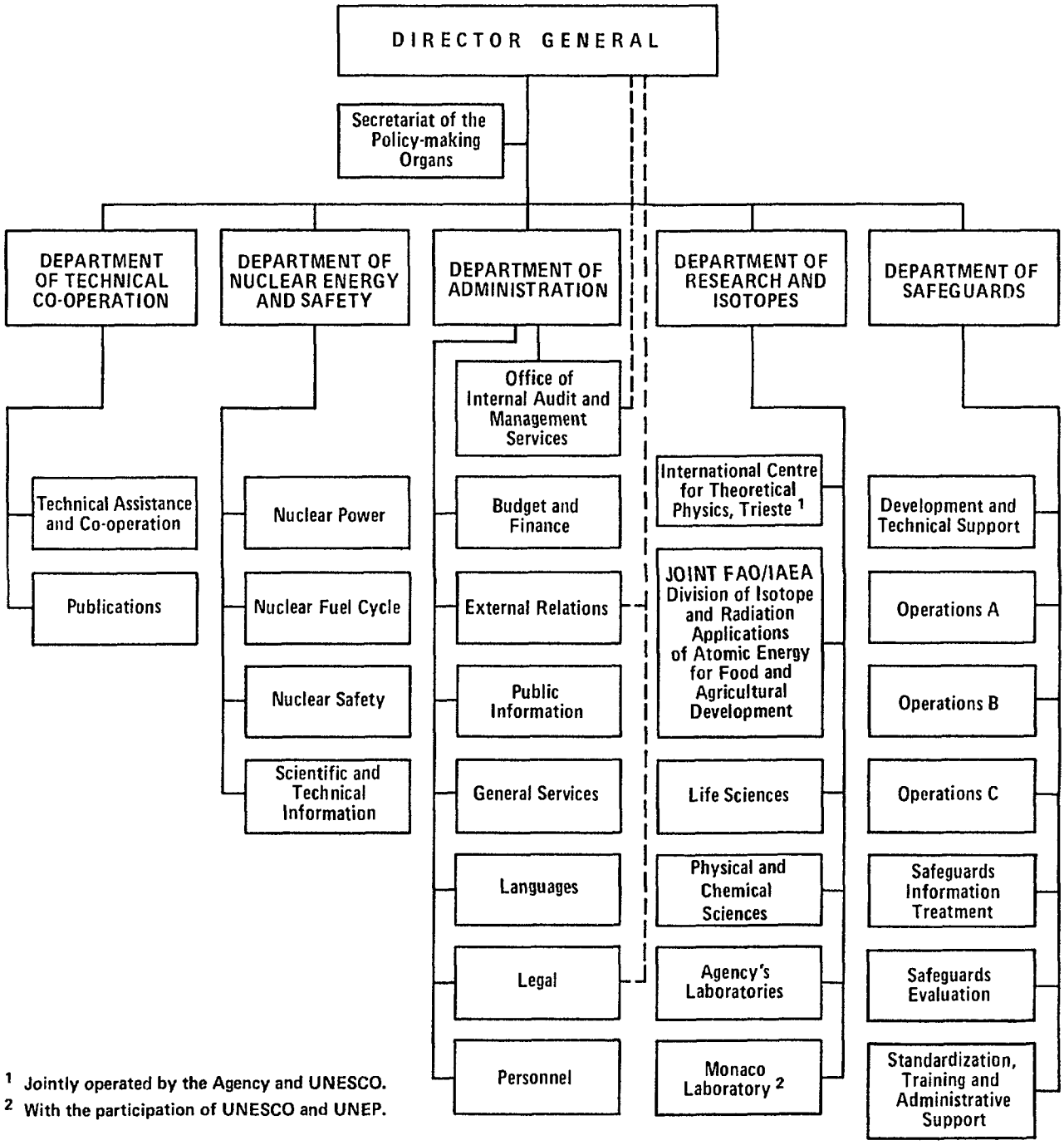
Table 129

	1986 Adjusted				1987				1988 a/			
	P	GS	M&O	Total	P	GS	M&O	Total	P	GS	M&O	Total
Contract administration services	2	4	-	6	2	4	-	6	2	4	-	6
Conference services	5	7	-	12	5	8	-	13	5	8	-	13
Translation and records services	46	41	1	88	46	41	1	88	46	41	1	88
Interpretation	8	1	-	9	8	1	-	9	8	1	-	9
Medical services	3	13	3	19	3	15	3	21	3	15	3	21
Library	5	10	-	15	5	10	-	15	5	10	-	15
Data processing services	33	27	-	60	31	30	-	61	31	30	-	61
Printing and publishing	17	106	18	141	17	106	18	141	17	106	18	141
Total Appropriation Section	119	209	22	350	117	215	22	354	117	215	22	354

a/ See Introduction, para 94

ANNEX 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	A (less part of A.3)
Nuclear Fuel Cycle	B, C (less part of C.2)
Nuclear Safety	H, I, S.5.3
Scientific and Technical Information	S.5.2, S 6.5 (Agency's share), part of A.3
3. RESEARCH AND ISOTOPES	
Food and Agriculture	D
Life Sciences	E (less part of E.4)
Research and Laboratories	F, G (less G.2), part of A.3
Agency Laboratory (allocated)	
4. OPERATIONAL FACILITIES	
International Centre for Theoretical Physics	G.2
International Laboratory of Marine Radioactivity	part of E.4, part of C.2
5. SAFEGUARDS	
Programme Co-ordination	Part of S.1.1
Operations A, Operations B, Operations C	J.2
Development and Technical Support	J.3
Information Treatment	J.1
Evaluation	J.4
Standardization, Training and Administrative Support	J.5
6. POLICY-MAKING ORGANS	S.1.2
7. EXECUTIVE MANAGEMENT AND ADMINISTRATION	
Executive Management	S.1.1 (less Safeguards Programme Co-ordination)
Administration	S.2, S.5.1
Internal audit and management	S.2.3
Budget and finance	S.2.6
External relations	S.2.1
Public information	S.5.1
Legal advice	S.2.2
Personnel	S.2.4
8. GENERAL SERVICES	S.4
9. SHARED SUPPORT SERVICES	
Contract administration services	S.6.1
Conference services	Part of S.6.2
Interpretation	Part of S.6.2
Translation and records services	S.6.3
Medical service	S.6.4
Library	S.6.5
Data processing services	S.6.6
Printing and publishing	S.6.7