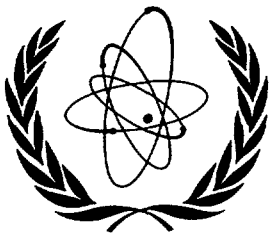

International Atomic Energy Agency

ANNUAL REPORT OF THE BOARD OF GOVERNORS TO THE GENERAL CONFERENCE

1 July 1962 - 30 June 1963

GC(VII)/228

Printed by the
International Atomic Energy Agency
in Austria - July 1963

CONTENTS

LIST OF ABBREVIATIONS

ACABQ	Advisory Committee on Administrative and Budgetary Questions
ACC	Administrative Committee on Co-ordination
Agency	International Atomic Energy Agency
ECOSOC	Economic and Social Council of the United Nations
ENEA	European Nuclear Energy Agency of the Organisation for Economic Co-operation and Development
EPTA	United Nations Expanded Programme of Technical Assistance
FAO	Food and Agriculture Organization of the United Nations
IANEC	Inter-American Nuclear Energy Commission of the Organization of American States
IBWM	International Bureau of Weights and Measures
ICSU	International Council of Scientific Unions
ILO	International Labour Organisation
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNSCEAR	United Nations Scientific Committee on the Effects of Atomic Radiation
WHO	World Health Organization
WMO	World Meteorological Organization

NOTE

All sums of money are expressed in United States dollars.

INTRODUCTION

1. The Board presents the following report on the sixth year of the Agency's work. [1]

2. The membership of the Agency increased from 77 to 82. Liberia became a Member on 5 October 1962, Saudi Arabia on 13 December 1962, Uruguay on 22 January 1963, Bolivia on 15 March 1963, and the Syrian Arab Republic on 6 June 1963.

3. The amendment to Article VI.A.3 of the Agency's Statute, providing for more equitable representation on the Board of the area of Africa and the Middle East [2], entered into force on 31 January 1963.

4. One of the more important tasks undertaken by the Board and the Director General at the request of the General Conference has been the preparation of proposals for a long-term programme for the Agency's activities. [3] This is being reported separately. [4]

5. Amongst the significant developments of the past year has been the decision of the General Assembly of the United Nations at its seventeenth regular session to hold a third International Conference on the Peaceful Uses of Atomic Energy in Geneva in 1964. [5] On 18 March 1963 the Middle Eastern Regional Radioisotope Centre for the Arab Countries, established under the auspices of the Agency, was inaugurated in Cairo. There has also been increasing interest in developing countries in nuclear power, and preliminary survey teams have been sent by the Agency to Pakistan, the Philippines and Thailand. The Special Fund has since approved a "Pre-investment study on power, including nuclear power in Luzon (the Philippines)", for which the Agency will serve as Executing Agency. These and other matters are reported in detail in the following chapters.

6. Separate reports are being submitted to the General Conference, in compliance with the resolutions adopted at its sixth regular session, on matters such as the financing of the Agency's activities and co-ordination in power questions. A report on technical assistance provided by the Agency in 1962 is also being submitted to the General Conference.

---

[1] Previous reports were issued as documents GC(II)/39, GC(III)/73, GC(IV)/114, GC(V)/154 and GC(VI)/195.

[2] See document INFCIRC/41.

[3] See also document GC(VI)/203 and Resolution GC(V)/RES/105.

[4] Document GC(VII)/227.

[5] See paras. 11 and 12 below.

PLANNING AND ADMINISTRATION

1. The Board

7. The fifth Board held its last meeting on 21 September 1962 and the sixth Board met for the first time on 27 September 1962. On that occasion it elected Mr. I. H. Usmani (Pakistan) Chairman, and Miss B. M. Meagher (Canada) and Mr. W. Billig (Poland) Vice-Chairmen. The composition of both the fifth and sixth Boards, and of their committees, is given in Annex I.

8. The sixth Board met again in February 1963 when it held six meetings; it met briefly on 26 March and 13 May, held 16 meetings in June and plans to meet in September immediately before the General Conference. The sixth Board thus held 24 meetings during the period under review, and a total of 21 committee meetings were also held.

9. The General Conference will recall that the amendment to Article VI. A. 3 of the Statute to provide for more equitable representation on the Board for the area of Africa and the Middle East had not come into force by the time it completed the constitution of the sixth Board on 26 September 1962. Following the course taken by its predecessor [6], the sixth Board accordingly invited the Governments of Ghana and Tunisia to be represented at its meetings until the end of the seventh regular session of the General Conference, in order to participate in its work with the same rights as Members of the Board, to the extent that the Statute permitted. The amendment came into force on 31 January 1963, so that the size of the seventh Board will be increased by two Members to 25.

2. The Scientific Advisory Committee

10. The Scientific Advisory Committee held its ninth meeting in Geneva on 3 and 4 October 1962 and its tenth meeting on 8 and 9 February 1963.

3. External relations

(a) The United Nations

11. On 29 November 1962 the Director General orally presented the Agency's annual report to the General Assembly for the year 1961-62 [7]. At the conclusion of the debate the General Assembly adopted two resolutions: in the first - Resolution 1769 (XVII) - the General Assembly took note of the report; in the second - Resolution 1770 (XVII) - the Secretary-General was requested,

> "with the assistance of the United Nations Scientific Advisory Committee, in co-operation with the Agency and in consultation with interested specialized agencies",

to proceed with plans for a third International Conference on the Peaceful Uses of Atomic Energy, to be held in Geneva for ten calendar days in the autumn of 1964.

12. Resolution 1770 (XVII) was brought to the attention of the Board in February 1963, together with a consequential recommendation by the Agency's Scientific Advisory Committee for reducing the scope of the Agency's 1964 programme of scientific meetings. The Board noted that the Secretary-General of the United Nations would consult UNSAC in April and that the Director General had accepted an invitation to attend these meetings. In June the Board was informed that UNSAC had decided that the conference would take place in 1964, but on a smaller scale than the one in 1958. About one thousand papers

---

[6] See document GC(VI)/195, para. 8.

[7] GC(VI)/195 and INFCIRC/39.

would be presented and the number of review papers would be much greater than for the two preceding conferences. A scientific exhibition was to be held at the same time at the Palais des Nations.

13. The Board's attention was also drawn to a number of other resolutions adopted by the General Assembly including those on the report of UNSCEAR, on international co-operation on the peaceful uses of outer space, and on the conversion to peaceful needs of the resources released by disarmament. [8]

14. The Agency has continued to provide scientific and technical support to UNSCEAR and to give advice upon request to WMO regarding its plan for world-wide measurements of atmospheric radioactivity.

15. The General Conference will recall that, in Resolution GC(VI)/RES/130, it asked the Director General to give full co-operation to the Secretary-General of the United Nations in the fulfilment of the task entrusted to him by ECOSOC Resolution 891 (XXXIV), on the basic aspects of economic and social consequences of disarmament. In response to that request a paper was contributed to the United Nations on the possible effects of nuclear energy development of an agreement on general and complete disarmament.

16. In response to other resolutions adopted by the United Nations, reports were contributed on matters such as the Agency's role and responsibilities in industrialization and on the United Nations Development Decade which constituted part of the Secretary-General's report to ECOSOC.

17. The Agency provided scientific secretaries and other help to the United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas held in Geneva in February 1963. The Secretariat presented a paper on the prospects and problems of nuclear power in developing areas and another on radioactive nuclides and their radiations as an important tool for the benefit of the less-developed areas.

18. As authorized by the General Conference [9], the Board submitted an annual report to ECOSOC covering the period 1 April 1962 to 31 March 1963. [10]

(b) Participation in the work of ACC

19. The Deputy Director General for Administration, Liaison and Secretariat represented the Director General at the thirty-fifth session of ACC held in New York in October 1962, and the Director General attended the session held in May 1963 in Geneva. The Agency also participated in all meetings of ACC's Preparatory Committee.

(c) The specialized agencies

20. The inter-secretariat working groups with WHO and FAO have now held several meetings and are performing a useful function, particularly in the planning stage of projects. In view of a potential increase in activities of joint interest to the Agency and UNESCO, for example in hydrology, oceanography and education in the physical sciences, consideration is also being given to the setting up of a working group with that organization.

(d) Intergovernmental organizations

21. In conformity with the relationship agreements with ENEA and IANEC, the work of the Agency, particularly that concerning regulatory activities, is continuing to be

---

[8] General Assembly Resolutions 1764 (XVII), 1802 (XVII) and 1837 (XVII) respectively.

[9] Resolution GC(VI)/RES/115.

[10] INFCIRC/43.

co-ordinated with the work of these organizations, and an inter-secretariat working group is being set up with ENEA.

4. Administration

(a) Personnel

22. On 30 June 1963 the staff of the Agency was composed of 245 staff members in the Professional category and above, and 306 in the General Service category. The number of nationalities represented among that section of staff which is subject to geographic distribution was 44.

(b) Finance

23. The budget for 1963 was reviewed by ACABQ whose report was noted by the General Assembly at its seventeenth regular session.

I. Regular Budget

The financial year 1962

(i) Assessments

24. The original assessment of contributions for 1962 of Member States included in the scale of assessment for that year amounted to $6 161 000; this was subsequently increased to $6 169 009 by the assessment of three new Members on the following scale:

Member State	Percentage
Congo (Leopoldville)	0.04
Liberia	0.04
Saudi Arabia	0.05

25. The General Conference at its sixth regular session voted a supplementary appropriation of $470 600 for 1962, based on the scale of assessment for 1963 [11]. Assessments on new Members not included in the 1963 scale increased this appropriation to $471 070.

(ii) Receipts

26. By 31 December 1962 the Agency had received contributions towards the Regular Budget for 1962 amounting to $5 621 480, which represents 91.12% of the original total assessment. A further amount of $16 824 was received in respect of the supplementary appropriation, increasing the total received to $5 638 304; although by the end of the year almost the total supplementary assessment was unpaid, most of it was offset as of 1 January 1963 by the respective Member States' shares in the 1960 cash surplus.

27. By 30 June 1963 $6 177 901 or 93.04% of the total contributions due, including original and supplementary assessments, had been received towards the Regular Budget for 1962. [12]

---

[11] See Resolution GC(VI)/RES/116 and document GC(VI)/195, para. 35.

[12] See Annex II, which shows outstanding contributions to the 1958, 1959, 1960, 1961 and 1962 Regular Budgets.

(iii) Obligations

28. The obligations for 1962 amounted to $6 446 139 which resulted in budgetary savings of $285 461 from the total appropriations for 1962, including supplementary appropriations. A further $52 756 from miscellaneous income and assessments on new Member States brought the total budgetary surplus at 31 December 1962 to $338 217, as follows:

Budgetary savings	$285 461
Miscellaneous income	44 277
Assessments on new Member States	8 479
Budgetary surplus for 1962	$338 217

29. Although the budgetary surplus for 1962 was $338 217, contributions outstanding for the same year amounted to $1 001 775, leaving a provisional cash deficit of $663 558.

30. Unliquidated obligations in respect of 1962 appropriations at 31 December 1962 were $808 293, of which $362 365 had been liquidated by 30 June 1963.

(iv) Transfers between sections of the 1962 Budget

31. In September 1962 the Board approved the transfers of $9500 from Section 6 - Distribution of Information to Section 13 - Non-technical supplies and equipment, for the purchase of composition typing equipment which will reduce external printing costs.

The financial year 1963

(i) Assessments

32. After the General Conference had approved the budget and the scale of contributions for 1963, five States joined the Agency and were assessed for 1963 as follows:

Member State	Percentage
Bolivia	0.04
Liberia a/	0.04
Saudi Arabia a/	0.06
Syrian Arab Republic	0.05
Uruguay	0.10

a/ See also the table in para. 24.

(ii) Receipts

33. By 30 June 1963 the following advances to the Working Capital Fund and contributions to the Regular Budget for 1963 had been received:

Advances to the Working Capital Fund	$2 001 200
Contributions to the 1963 Regular Budget	$2 578 951

By that date Member States had thus paid 99.77% of the total advances due to the Working Capital Fund and 36.10% of the total contributions due to the 1963 Regular Budget. [13]

[13] See Annexes III and IV.

II. Operational Budget

General Fund for 1962

(i) Pledges and receipts

34. Of a total amount of $1 380 470 pledged to the General Fund for 1962, $650 735 had been paid by 31 December 1962. By June 1963 a further amount of $660 500 had been received, leaving a balance of $69 235 still to be paid.

35. With regard to the target of $2 million set for 1962 by the General Conference at its fifth regular session, there was a shortfall of approximately $620 000 in the actual pledges made by Member States. [14]

(ii) Obligations

36. The total operational obligations incurred during 1962 amounted to $1 403 407. Unliquidated obligations at 31 December 1962, including obligations brought forward from previous years, amounted to $991 372.

General Fund for 1963

37. The total amount pledged to the General Fund for 1963 at 30 June 1963 was $1 318 970 of which $372 047 had been paid by that date. [14]

(c) Legal matters

38. Most of the legal work done during the period under review was in connection with the Agency's technical activities and is reflected in the chapter on scientific and technical work. Five further instruments of acceptance of the Agreement on the Privileges and Immunities of the Agency were deposited with the Director General; by 30 June 1963, 16 States had become parties to the Agreement.

[14] See Annex V.

SCIENTIFIC AND TECHNICAL WORK

1. Nuclear power, reactors, fuels and materials

(a) Nuclear power

39. The growing interest in the developing countries in nuclear power has been reflected in an increasing number of requests to the Agency for advice on power programmes and the selection of power reactor sites. [15]

40. With the help of the Agency, the Philippine Government submitted a request to the United Nations Special Fund for assistance in making a pre-investment study on power, including nuclear power, in Luzon. Following approval of the request by the Governing Council of the Special Fund in June 1963 work began on the plan of operation for the study.

41. In December 1962 a team of three experts, one of whom was an expert on conventional power, undertook a survey of Thailand's power needs and resources to determine the technical and economic feasibility of introducing nuclear power there. The experts' report will be issued shortly.

42. In the latter part of 1962 the Agency issued a further report on information gathered on the design, construction, operation and costs of seven power reactor projects in the United States of America and one in Canada [16]. Information is now also being collected on the nuclear power station at Bradwell in the United Kingdom of Great Britain and Northern Ireland. A review of cost information available on nuclear power plants in Member States was also issued [17].

43. In March 1963 a group of five consultants reviewed the current status of the use of nuclear reactors for the desalination of water and made recommendations on the possible future programme of the Agency in this subject. The Agency is also helping the Tunisian Government to evaluate a desalination project.

44. A panel of experts met in April 1963 to discuss the economic aspects of the integration of nuclear power plants in electric power systems.

45. A Conference on Operating Experience with Power Reactors, held in Vienna in June 1963, yielded considerable new information on the operating characteristics, technology, economics and safety of nuclear power plants.

46. Early in 1963 the Agency started a survey of the pressure vessel codes enforced in Member States, with a view to their extension to cover reactor vessels and systems. The fourth volume of the Directory of Nuclear Reactors, covering technical data on 55 power plants in 11 Member States, was published in August 1962 [18].

(b) Research reactors

47. Under the Agency's programme to help new research centres make effective use of their reactors, a Study Group Meeting on Utilization of Research Reactors was held in Bangkok in December 1962 for the benefit of centres in Far Eastern and East Asian Member States. Sixty scientists from 15 countries attended the study group which put forward several proposals for further action by the Agency, including the holding of smaller

---

[15] See the report to the General Conference on co-ordination in power questions (document GC(VII)/229).

[16] Document GC(VI)/INF/54.

[17] Document GC(VI)/INF/53.

[18] STI/PUB/53.

regional meetings on more specialized topics. Experts subsequently visited the Philippines and Thailand to advise on the preparation of suitable programmes in chemistry and isotope production.

48. The Governments of Norway, Poland and Yugoslavia have decided to undertake a NORA-type project [19] in association with the Agency for scientific co-operation in reactor physics. The draft agreement between the Agency and these Governments was approved by the Board in June 1963.

49. The second Agency panel on heavy water lattices [20] was held in February 1963 to discuss, amongst other matters, techniques for lattice evaluations, calculations of lattice parameters and computational techniques.

50. In March 1963 a panel on chemical research using research reactors discussed the use of low and medium flux reactors for chemical research. In addition, the Agency has started a study of the possible design and construction of an international high flux research reactor with a flux of more than 10^{16} neutrons to the square centimetre per second.

(c) Nuclear physics

51. In July/August 1962 the Agency held a Seminar on Theoretical Physics in Trieste which was attended by 100 scientists from 31 Member States. High energy and particle physics were studied at the seminar, which had the character of an institute for advanced co-operative study and research. In August/September 1962 in the Low Tatra Mountains, the Government of the Czechoslovak Socialist Republic and the Agency jointly held an international summer school on selected topics in nuclear theory, which was attended by 27 students.

52. In accordance with Resolution GC(VI)/RES/132, adopted by the General Conference at its sixth regular session, the Director General has submitted to the Board the results of the study made on ways and means to establish under the auspices of the Agency an international centre for theoretical physics. In June 1963 the Board decided to accept the offer of the Italian Government, and approved the establishment of the centre at Trieste.

53. In September 1962 a Symposium on Inelastic Scattering of Neutrons in Solids and Liquids was organized by the Agency and co-sponsored by UNESCO at Chalk River, Canada. Sixty-five scientists from 13 Member States participated in this symposium.

54. In October 1962 a panel of experts was convened in Vienna to assess thermodynamic data of uranium-carbon and plutonium-carbon systems, and a collection of the most reliable thermodynamic data of these systems has since been published by the Agency [21].

55. The first meeting of an international scientific working group on nuclear data was held in May 1963 and was attended by 15 specialists, including representation from 11 Member States and from ENEA. The recommendations made concerned gathering information on activities and compiling nuclear data; the next meeting of the working group is planned for January 1964.

(d) Reactor fuels and equipment

56. Arrangements were completed for the transfer of title from Belgium to the Congo (Leopoldville) of the fuel in the TRICO research reactor; additional enriched uranium will

---

[19] See document GC(VI)/195, para. 49.

[20] See document GC(IV)/114, para. 214.

[21] STI/DOC/10/14.

be obtained from the United States for use in the reactor. [22] At its meeting in June 1963 the Board approved an extension of the project relating to the reactor to provide for its conversion from a TRIGA Mark I to a Mark II type; the Government of the United States offered to donate equipment worth $50 000 required for the planned conversion. The Board has also approved a project for the supply of fuel from the Union of Soviet Socialist Republics to a sub-critical assembly in Finland.

57. The Board approved projects for the supply of certain quantities of source and special fissionable materials to Austria, Finland, Greece, the United Arab Republic, Yugoslavia, to the Österreichische Studiengesellschaft für Atomenergie for an Agency research contract, and to the Agency for research work at its Laboratory.

2. Isotopes and radiation sources

58. In November 1962 a Seminar on the Practical Applications of Short-lived Radioisotopes Produced in Small Research Reactors was held in Vienna to discuss the production and separation of radioisotopes having a half-life of less than three days, and their use mainly in medical studies.

(a) Medicine

59. As in previous years, much of the Agency's technical assistance programme was concerned with medical applications of radioisotopes and radiation sources. Under the Agency's research contracts, 14 hospitals and medical research institutes (ten of which are in developing countries) were doing work in 1962 on the use of radioisotopes in clinical research and the diagnosis of disease, particularly tropical diseases.

60. A panel of experts on the co-ordination of research contracts in tropical medicine, which met in Vienna in 1962 and in which WHO co-operated, recommended certain subjects to which priority should be given.

61. The co-ordinated research programme on the use of calcium-47 for the study of bone metabolism, in which 12 institutes are participating, is nearing completion, and another co-ordinated programme has been started on the development of techniques in using iodine-125 that are particularly suited for application in tropical countries.

62. At the Agency's laboratory at Headquarters, a whole-body counter came into operation which was set up with the assistance of the United States Atomic Energy Commission. It is being used for measurements on patients carrying substantial amounts of the radiocolloid thorotrast, for checking suspected contamination of radiation workers and for training in whole-body counting techniques [23].

63. Under the project to calibrate and standardize thyroid radioiodine uptake measurements, a member of the Secretariat has now visited some 60 hospital isotope laboratories in 16 Member States.

64. A Meeting on Practical Methods of Assisting Radiotherapy Centres in Less-developed Areas was held jointly with WHO in September 1962 in Montreal, Canada. Recommendations of the meeting have been published in several radiological journals [24]. In

---

[22] For the texts of the Agreements see document INFCIRC/37.

[23] A summary of the work carried out in the laboratories is given in Annex VI.

[24] British Journal of Radiology, 36, 453, June 1963. These recommendations will also appear shortly in the following journals: Acta Radiologica (Stockholm), Annales de Radiologie and Acta Iberica Radiológica Cancerológica.

April 1963, an inter-regional adviser on the physical aspects of radiotherapy was appointed in the Eastern Mediterranean area. In June 1962, a second consultants' meeting on the standardization of the output of teletherapy sources was held in Vienna. In addition, the Secretariat has continued to compile and publish relevant physical data for the guidance of radiotherapists and hospital physicists.

(b) Agriculture [23]

65. In October/November 1962 the Agency held a regional training course in Ankara, at which 20 participants were trained in the use of radioisotopes and radiation in studying soil/plant relationships. An international course was held jointly with FAO from July to September 1962 at Cornell University, United States, at which 20 students were trained in the use of radioisotopes and radiation in the animal sciences.

66. The research contract programme which the Agency began in 1962 on the efficiency of fertilizer application in rice-growing areas was extended to include institutes in Pakistan and the Republic of Korea. [25] A planning meeting of participating research workers was held in December 1962 at Los Baños in the Philippines.

67. The Agency has started two further co-ordinated research contract programmes: one on the application of radioisotopes and radiation to the sterile male technique for the control of insect populations, in which institutes in Belgium, El Salvador, the Federation of Rhodesia and Nyasaland, Israel, Italy and Tunisia are participating; and another on their application in studies on plant nutrient supply and movement in soil systems, embracing institutes in Belgium, Hungary, Poland, the United Arab Republic and the Agency's Laboratory. In all, 22 contracts on agricultural applications were awarded from Agency funds in 1962, 14 of these to institutions in developing Member States.

68. Three panel meetings on the Agency's agricultural research programme were held at the Agency's Headquarters: the first in September to discuss the draft of a laboratory training manual on the use of isotopes and radiation in soil/plant relations research; the second in October on insect population control by the sterile male technique; and the third in December 1962 on irradiation control of harmful organisms transmitted by food and by feed products.

69. In April 1963 in Athens the Agency and FAO held a Symposium on the Use and Application of Radioisotopes and Radiation in the Control of Plant and Animal Insect Pests. In May 1963 an Agency/FAO Study Group on Radiation and Isotope Applications in Olive Fly Control was held in Lisbon.

70. Work has started on the United Nations Special Fund project in Yugoslavia for the creation of an institute for the application of nuclear energy in agriculture, veterinary science and forestry. [26]

(c) Industry

71. Work is continuing on an international survey to obtain comprehensive information on the present applications of isotopes in industry and the economic benefits they entail.

72. On the basis of a survey of scientific literature published up to 1960, the Agency has also issued a classification of 899 various industrial applications of radioisotopes used in 40 types of industry. [27]

---

[25] See document GC(VI)/195, para. 62.

[26] See document GC(VI)/195, para. 18.

[27] Radioisotope applications in industry, STI/PUB/70.

73. In May 1963 the Agency held a conference in Salzburg, Austria, on the Application of Large Radiation Sources in Industry, at which information was exchanged on the use of massive irradiation sources in industry for the production of high polymers and certain chemicals, as well as for the sterilization of industrial products. [28]

(d) Chemistry

74. In September 1962 the Agency held a panel on the analytical chemistry of nuclear materials, which discussed the determination of uranium and thorium in ores, concentrates and metals, the determination of important trace impurities in uranium and the analysis of irradiated fuels. The panel also made recommendations to laboratories starting this type of work, surveyed the work of the Agency's Laboratory at Seibersdorf in the international comparison of analytical techniques and made several other recommendations for further work. During the first half of 1963, 21 laboratories including that of the Agency were participating in this work, and a comparison of impurity analysis of the solution of uranyl nitrate was completed. The Laboratory also continued experimental work on the application of gas chromatographic methods to enrich tritium. [23]

(e) Hydrology

75. Under the Agency/WMO world-wide survey of the concentration of hydrogen and oxygen isotopes in rainwater, the facilities set up at the Agency's Headquarters' laboratory have been used for analysing samples collected from the network of sampling stations. [23]

76. A panel was convened in December 1962 to discuss the present and future applications of radioisotope techniques to hydrological problems and to advise on the Agency's research contract programme. A Symposium on the Application of Radioisotopes in Hydrology was held in Tokyo in March 1963, which was the first international meeting of its kind. At the symposium it was emphasized that all possible methods of developing water resources, particularly using radioisotope techniques, should be applied.

77. Work has begun on the field experiment to trace the movement of silt in the Tonle Sap Great Lake region of Cambodia as part of the international project for the development of the Lower Mekong River basin. An experimental investigation of the behaviour of underground water in the Antaly region, Turkey, is in progress. The work is being carried out within the framework of a United Nations Special Fund project for which FAO is the Executing Agency.

(f) Other applications

78. At a Symposium on Radioactive Dating held in Athens in November 1962, the use of radioactive dating techniques in geochemistry, geophysics and geology, and in the study of meteorites was discussed.

(g) Radiation standards

79. As part of the services provided for Member States on request, the Agency's Laboratory is continuing the distribution started in 1962 of standardized samples of radionuclides to enable laboratories, hospitals and clinics to calibrate their measuring instruments. Seventeen radionuclides are being distributed, including Cs^{132}, for the calibration of whole-body counters and mock-iodine for the calibration of iodine-uptake measurements. Requests for 1142 standards were received for 1963 from 103 institutions in 40 Member States, an increase of 50 per cent compared with 1962. During the period covered by this report, 985 samples were dispatched to 40 Member States.

---

[28] It will be recalled that the Agency held a Conference on the Application of Large Radiation Sources in Industry and especially to Chemical Processes in Warsaw in September 1959 (see document GC(IV)/114, para. 203, and STI/PUB/12).

80. The Agency has continued its co-operation with IBWM and national laboratories to develop and improve methods of measuring absolute activity. Inter-comparison measurements of four nuclides have been made. The Laboratory has undertaken measurements by various methods of nuclear data important for standardization purposes, including half-life and beta main energy of P^{32} and of Tl^{204}, and has also started direct measurements of absorbed X- and gamma-rays using a special calorimetric device set up in 1962.

3. Protection against radiation

(a) Research on radiation effects

81. Following consultations with experts, the Agency's research programme on the biological effects of nuclear radiation is concentrating on studies of toxicity of incorporated radionuclides, and investigations of new methods of radiosensitization. During 1962 research was in progress under ten contracts with institutions in eight Member States.

82. In July 1962 the Agency held a Symposium on Biological Effects of Ionizing Radiation at the Molecular Level in Brno, Czechoslovak Socialist Republic. The discussions showed the increasing interest of biophysicists and biochemists in recent fundamental discoveries in molecular biology and in their relevance to the understanding of the biological hazards of ionizing radiation.

83. In October 1962 the Agency and WHO jointly held in Vienna a Scientific Meeting on the Diagnosis and Treatment of Radioactive Poisoning; this was complementary to the meeting in Geneva in October 1960 on the diagnosis and treatment of acute radiation injury. The Agency also contributed substantially to the Second International Congress of Radiation Research at Harrogate, United Kingdom, in August 1962.

84. In June 1963 the Agency held a meeting in Vienna of governmental experts to review gaps in present knowledge of the toxic effects of incorporated radionuclides and to discuss arrangements for co-ordinated research to be carried out, without cost to the Agency, in technically advanced Member States.

(b) Research on the safe management of radioactive waste

85. In 1962 this programme continued under Agency contracts with 13 institutions in ten Member States. It is designed principally to help developing countries to find cheap ways of treating radioactive wastes with the minimum release of radioactivity, and to obtain more information on the movement and effects of radioactivity in the environment, particularly the marine environment. In November 1962 the Agency held a panel meeting for co-ordination of research on radioactivity in the marine environment; in February 1963 the Agency served as host to the third annual meeting of ACC's Sub-Committee on Oceanography, which discussed co-ordination of the relevant work of the United Nations family.

(c) Dosimetry and radiation protection services

86. In December 1962 the Agency held a Symposium on Neutron Detection, Dosimetry and Standardization at Harwell, United Kingdom. It was followed by a panel discussion on methods of standardization and inter-comparison of neutron-measuring instruments.

87. At the end of 1962 a member of the Secretariat served on a short technical assistance assignment in China (Taiwan) to advise on radiation protection services, and studied health physics activities in a number of other countries in South East Asia and the Far East.

88. In June the Board approved a regional agreement between the Agency and four Scandinavian countries regarding the provision of emergency assistance in the event of a radiation accident.

(d) Safety of installations

89. The Agency has convened panels of experts to review the safety aspects of the Thai research reactor, the Philippines research reactor, the PINSTECH research reactor in West Pakistan, and to give advice regarding the selection of a site for the proposed ~~5 MW(e)~~ 50 MW Ishurdi power reactor in East Pakistan. A team of experts has also advised the Government of the United Arab Republic on the safety aspects of site selection for a 150 MW(e) power reactor.

90. In March 1963 the Agency held a Symposium on Criteria for Guidance in the Selection of Sites for the Construction of Reactors and Nuclear Research Centres, in Bombay, India.

(e) Regulatory and legal work

91. The Agency's basic safety standards for radiation protection were approved by the Board as a first edition in June 1962 and subsequently published in the Safety Series. [29]

92. In September/October 1962 a group of consultants considered criticality problems arising from the transport of radioactive materials, and in March 1963 a panel of experts was convened to discuss the revision of the Agency's Regulations for the Safe Transport of Radioactive Materials. [30]

93. The first drafts of manuals on the following subjects have been considered by panels of experts:

(a) The provision of radiological protection services in small nuclear establishments; and

(b) The basic requirements of an adequate system of personnel dosimetry for radiation workers.

The Secretariat has also published, with the help of a group of consultants, a basic classification of radionuclides in which they are graded in order of their relative radiotoxicity. [31]

94. In October 1962 the Agency held a symposium in Vienna on the Treatment and Storage of High-level Wastes, which was attended by some 130 scientists from 19 countries. The symposium reviewed the practices at present followed in technically advanced countries and the future lines of research and development on this subject.

95. Panels of experts were convened in Vienna in September and November 1962 to consider the disposal of radioactive waste into the ground, and methods of surveying and monitoring marine radioactivity.

96. The Panel on the Legal Implications of Disposal of Radioactive Waste into the Sea concluded its work in January 1963 by adopting alternate sets of draft articles. The report of the panel is being sent to Member States for comment.

97. On 29 April 1963 the Agency convened in Vienna an International Conference on Civil Liability for Nuclear Damage. On 19 May 1963 the Conference adopted, by 43 votes in favour, none against and six abstentions, the Vienna Convention on Civil Liability for Nuclear Damage and an Optional Protocol Concerning the Compulsory Settlement of Disputes. Both these instruments were opened for signature on 21 May 1963.

---

[29] STI/PUB/26.

[30] STI/PUB/40.

[31] STI/DOC/10/15.

PROGRAMMES AND ACTIVITIES

1. Technical assistance

98. A full report on the technical assistance provided by the Agency in 1962 is being submitted separately. [32] The main points are summarized in the paragraphs below.

99. The demands on the programme have continued to grow rapidly and in 1962 exceeded the resources available by some thirty per cent [33].

100. Funds available for the programme from voluntary contributions to the General Fund, which decreased from $1 007 842 in 1960 to $980 881 in 1961, increased slightly to $1 146 294 in 1962. Nevertheless, voluntary contributions again fell far short of the target set - $1 380 470 pledged, compared with a target of $2 million - and the amount of $1 146 294 available for technical assistance was commensurately inferior to the budgeted figure of $1 625 000. Moreover, despite the recommendation made in Resolutions GC(V)/RES/100 and GC(VI)/RES/126, only 21 Member States have pledged amounts for 1963 that are equal to or greater than their percentage assessment of the Regular Budget.

101. The financial obligations incurred under the Agency's EPTA programme increased from $808 614 in 1961 to $843 259 in 1962, the latter representing 42.3% of the total funds available for technical assistance in 1962.

102. Table I below shows a summary of the training programme:

Table I

	1961	1962	1963
Fellowships awarded	344	428	187 a/
Scientific visits and research grants	11	5	6 a/
Visiting professors	19	27	14 a/
Training courses	6	7	9 b/

a/ As at 30 June 1963.

b/ International Training Course on Nuclear Science for High School Teachers, Nahal Soreq, Israel, 28 July - 5 September;

Regional Training Course on the Applications of Radioisotopes in Medicine, Buenos Aires, 12 August - 2 December;

Advanced International Training Course on the Physics of Radiotherapy, London, 2 September 1963 - 31 January 1964;

International Seminar on Atomic Energy for Atomic Energy Administrators, Vienna, 30 September - 4 October;

Regional Training Course on the Application of Radioactive Isotopes in Soil-Plant Relations, Ankara, 1 October - 25 November;

Agency/FAO International Training Course on the Use of Radiation and Isotopes in Entomology, Gainesville, Florida, United States, 7 October - 30 November;

Agency/UNESCO Regional Training Course in Scientific Documentation, New Delhi, 21 October - 29 November 1963;

International Training Course on Bio-assay of Radionuclides, Seibersdorf, Austria, 4 November - 2 December;

Regional Training Course on the Maintenance and Repair of Nuclear Electronic Equipment, Colombo, November 1963 - April 1964; and

Regional Training Course on the Use of Research Reactors, India (subject to confirmation).

[32] GC(VII)/INF/61.

[33] Technical assistance, offered or provided in 1962 free or partially free of charge, has shown a decrease from $845 000 in 1961 to approximately $700 000 in 1962.

103. One of the Agency's two mobile radioisotope laboratories gave training to 120 students in Viet-Nam, where it remained until September 1962, and in June training began in Singapore. The second laboratory was in Brazil where 340 students received training.

104. During 1962 ten students from Member States received training in the Agency's Laboratory.

105. During 1962, 180 technical assistance experts and visiting professors were working on Agency projects in 35 countries. Equipment of a total value of $284 700 was provided to 24 countries; further free equipment at an estimated value of $197 500 was donated to the Agency by two Member States.

2. Exchange of information

106. Twelve scientific conferences, seminars and symposia were organized by the Agency in 1962 and attended by 1600 scientists from 48 Member States and 12 international organizations. A list of the meetings held in 1962 and planned for 1963 is given in Annex VII.

107. Technical assistance to improve documentation services in developing Member States has been given for the first time in 1963. Scientific publications, back volumes of periodicals in the nuclear energy field, micro-filming and micro-reading apparatus and other documentation equipment has been supplied to Member States at their request.

108. During the period under review the Agency published approximately 20 000 pages of scientific and technical information, and the programme now comprises annually over a dozen volumes of the Proceedings Series, several technical directories, numerous issues in the Technical Reports Series and the Safety Series, bibliographies and documentation. Eight reviews by prominent scientists were published, six of them in the Atomic Energy Review (two issues) which has replaced the Review Series. Three issues of Nuclear Fusion were also published. The bibliographical work included two extensive bibliographies compiled by the Secretariat. The List of Bibliographies on Nuclear Energy was revised as well as the List of Periodicals in the Field of Nuclear Energy. The Agency's publications issued during the period under review are listed in Annex VIII.

109. A new method of publishing books by internal reproduction was introduced, making it possible to issue the proceedings of scientific meetings as well as other publications in a considerably shorter time and at lower cost.

110. During the year 1962-63 the Agency's library has increased to 21 000 volumes and to 53 000 reports. It now has also a collection of 203 films dealing with different aspects of atomic energy in 15 countries. A catalogue listing them has been issued and given wide distribution to Member States. The services the library provides on request now include films as well as bibliographic data, reference material and photocopying.

3. Research and development

111. The 1961 and 1962 research contract programmes are summarized in the following table:

Table II

Year	New contracts	Renewals	Total	Value [a/]
1961	26	47	73	$576 944
1962	51	47	98	$773 972

a/ From the Agency's funds. In addition 11 contracts to the value of $157 344 were awarded or renewed from funds made available by the United States Government in 1961, and 12, to the value of $154 607, in 1962.

112. Tables III and IV below give breakdowns by subject matter and by country of the research contracts awarded or renewed in 1962.

Table III

Subject matter of research	Number of contracts placed	Number of contracts renewed	Contribution from Regular Budget	Contribution from Operational Budget	Total
			$	$	$
Radioactive waste management and environmental research	5	8	161 595	-	161 595
Health physics and radiation protection	8	20	153 889	-	153 889
Radiobiology	4	6	94 500	-	94 500
Safeguards methods	2	1	51 700	-	51 700
Studies involving the use of reactors	1	2	47 735	-	47 735
Application of radioisotopes in agriculture	17	5	56 335	55 060	111 395
Application of radioisotopes in hydrology	4	1	43 995	-	43 995
Application of radioisotopes in medicine	10	4	55 110	54 053	109 163
~~Miscellaneous~~		~~1~~			
TOTAL	51	47	664 859	109 113	773 972

Table IV

Country	Number of contracts placed	Number of contracts renewed	Contribution from Regular Budget	Contribution from Operational Budget	Total
			$	$	$
Argentina	3	1	12 900	12 063	24 963
Australia	1	-	3 860	-	3 860
Austria	4	3	56 532	-	56 532
Belgium	4	3	36 805	-	36 805
~~Brazil~~		~~1~~			
Burma	1	-	-	7 970	7 970
Chile	1	1	28 400	-	28 400
China	-	1	-	3 460	3 460
Colombia	1	-	8 060	-	8 060
Czechoslovak Socialist Republic	2	2	38 340	-	38 340
Denmark	1	-	2 700	-	2 700
Finland	-	2	14 400	-	14 400
France	-	1	12 832	-	12 832
Germany, Federal Republic of	-	2	10 800	-	10 800
Greece	1	1	-	10 200	10 200
Hungary	2	1	13 650	-	13 650
India	2	1	65 555	-	65 555
Israel	3	4	58 905	10 200	69 105
Italy	1	1	12 500	-	12 500
Japan	2	2	21 320	-	21 320
Lebanon	1	-	-	5 240	5 240
Mexico	1	-	-	11 450	11 450
Netherlands	-	4	31 550	-	31 550
New Zealand	1	-	12 440	-	12 440
Norway	-	1	20 000	-	20 000
Pakistan	4	-	19 100	10 750	29 850
Philippines	1	1	-	13 900	13 900
Poland	1	3	28 210	-	28 210
South Africa	-	1	3 360	-	3 360
Spain	1	2	25 885	2 480	28 365
Sweden	3	-	40 440	-	40 440
Switzerland	1	1	12 180	-	12 180
Thailand	1	-	-	8 500	8 500
Tunisia	1	-	-	7 400	7 400
United Arab Republic	3	1	19 450	4 500	23 950
United Kingdom of Great Britain and Northern Ireland	1	4	13 725	-	13 725
Yugoslavia	2	3	40 960	1 000	41 960
TOTAL	51	47	664 859	109 113	773 972

4. Safeguards

113. During the past year, the Agency applied its safeguards in Finland (FiR-1 TRIGA reactor), Norway (NORA reactor), and the Congo (Leopoldville) (TRICO Triga reactor), and also in the United States to four reactors which have been submitted to safeguards for a limited period to permit the testing and development of the Agency's safeguards procedures. [34] Two inspections of the reactors in the United States were performed, in November 1962 and in May 1963. The application of safeguards in Yugoslavia (TRIGA reactor), and in Pakistan (AMF reactor), will start as soon as the reactors specified in the Agency projects in these countries, or their fuel, are delivered.

114. The Governments of Israel and South Africa informed the Agency of an agreement whereby ten tons of uranium oxide was sold to Israel under a commitment that it would be used solely for peaceful purposes. Similarly the Governments of Pakistan and the United Kingdom informed the Agency of a lease of three tons of natural uranium to the Pakistan Atomic Energy Commission, under a commitment that the material would be used for peaceful purposes only and would not be transferred outside Pakistan except with the written consent of the United Kingdom. Pursuant to paragraph 21(d) of the safeguards system, [35] these materials are considered PN source materials during the time they are in the recipient States.

115. In February 1963 the Board requested the Director General to formulate proposals to extend the safeguards system so as to provide procedures for application of safeguards to reactors of over 100 MW(t). The Board also re-established the Special Working Group of Expert Representatives on Safeguards that helped to formulate the existing system, and instructed it to review the Director General's proposals. Upon receiving the report of the Working Group in June the Board approved provisionally the procedures annexed to that report and decided to submit them to the General Conference for its consideration and appropriate action; it also decided to undertake in 1964 a general review of the safeguards system, giving particular attention to the provisions relating to the attachment of safeguards to equipment. [36]

116. In connection with the supply to Finland of enriched uranium for sub-critical assemblies [37], the Board approved the project agreement which provides that the safeguards applicable to the FiR-1 TRIGA reactor facility [38] should be extended to cover the new material and the assemblies. Similarly the extension of the TRICO project to cover the conversion of the reactor [37] will not require any change in the safeguards provisions for the project. [39] In approving the supply of certain quantities of special fissionable materials to several Member States [40] the Board decided that, insofar as the amount of PN material in the State did not permit exemption of the new supply pursuant to paragraph 32 of the safeguards document [35] and inclusion under the safeguards applied to an existing project is not practicable, safeguards might be suspended with regard to these materials within the limits specified by paragraph 39(b) of the safeguards document.

117. In June the Board approved an agreement between the Agency and the Governments of Japan and the United States regarding the transfer to the Agency of the administration of safeguards in connection with the bilateral agreement between the Governments concerning co-operation in the peaceful uses of atomic energy; it is expected that this agreement will

---

[34] INFCIRC/36.

[35] INFCIRC/26.

[36] For the text of the Board's resolution on this subject, see document GC(VII)/235.

[37] See para. 56 above.

[38] INFCIRC/24/Add. 1.

[39] See document INFCIRC/37, part III, Annex A.

[40] See para. 57 above.

enter into force in the near future for a four-year period, and pursuant thereto the Agency will apply safeguards in Japan to several reactors and to nuclear materials, and in the United States to any special fissionable material produced in Japan under the bilateral agreement and transferred to the United States. The Agency was also informed of an agreement between the Governments of Australia and Japan regarding the application of Agency safeguards to nuclear materials and specialized equipment exchanged or transferred between those countries.

118. To provide for the expected increase in the application of safeguards by the Agency and in that connection to facilitate the convenient scheduling of inspections, the Board has authorized the Director General, for the time being, to use seven members of the Secretariat as inspectors, in addition to the three in respect of whom it gave such authority in 1961.

ANNEX I

THE BOARD OF GOVERNORS: 1962-1963

A. Member States and their Governors

Member State			Governor or Representative
To 26 September 1962	1962-1963	From 26 September 1962	(30 June 1963)
	Argentina[a/ b/]		Mr. O.A. Quihillalt
	Australia[c/ d/]		Mr. A.D. McKnight
		Belgium[e/]	Mr. J. Errera
	Brazil[c/ f/]		Mr. M.D. Souza Santos
	Canada[c/ d/]		Miss B.M. Meagher (Vice-Chairman)
	Colombia[g/]		Mr. T.A. Marulanda
Czechoslovak Socialist Republic[h/]			
		Denmark[e/]	Mr. H.H. Koch
El Salvador[a/]			
	France[c/ d/]		Mr. B. Goldschmidt
Germany, Federal Republic of[a/]			
	Ghana[i/]		Mr. E.K. Dadzie
	Greece[g/]		Mr. A.G. Spanides
	Hungary[g/]		Mr. L. Janossy
	India[c/ d/]		Mr. H.J. Bhabha
		Indonesia[f/]	Mr. B. Darusman
		Iran[f/]	Mr. A.A. Azad
Iraq[a/]			
		Italy[f/]	Mr. C. Salvetti
	Japan[c/ d/]		Mr. F. Uchida
		Mexico[f/]	Mr. M. Cabrera Maciá
	Pakistan[g/]		Mr. I.H. Usmani (Chairman)
Portugal[h/]			
		Poland[e/]	Mr. W. Billig (Vice-Chairman)
	South Africa[c/ d/]		Mr. D.B. Sole
Sweden[h/]			
Thailand[a/]			
	Tunisia[i/]		Mr. B. Torki

Member State			Governor or Representative
To 26 September 1962	1962-1963	From 26 September 1962	(30 June 1963)
	Union of Soviet Socialist Republics[c/ d/]		Mr. V.S. Emelyanov
	United Kingdom of Great Britain and Northern Ireland[c/ d/]		Mr. M.I. Michaels
	United States of America[c/ d/]		Mr. H.D. Smyth
	Viet-Nam[g/]		Mr. Buu Hoi

a/ Elected by the General Conference on 30 September 1960 under Article VI.A.3 of the Statute.

b/ Designated by the Board on 16 July 1962 under Article VI.A.1 of the Statute.

c/ Designated by the Board on 21 June 1961 under Article VI.A.1 of the Statute.

d/ Designated by the Board on 19 June 1962 under Article VI.A.1 of the Statute.

e/ Designated by the Board on 19 June 1962 under Article VI.A.2 of the Statute.

f/ Elected by the General Conference on 26 September 1962 under Article VI.A.3 of the Statute.

g/ Elected by the General Conference on 5 October 1961 under Article VI.A.3 of the Statute.

h/ Designated by the Board on 21 June 1961 under Article VI.A.2 of the Statute.

i/ Represented on the Board pursuant to a resolution adopted on 9 October 1961 and a decision taken on 27 September 1962.

B. Committees

Note: Each Committee is presided over by the Chairman or, in his absence or disability, one of the Vice-Chairmen of the Board.

Title	Established	Composition	
		1961-62	1962-63
Committee to Advise the Director General on Permanent Headquarters	20 March 1958	Argentina Canada Greece Hungary India	Argentina Canada Greece Hungary India
Committee on Agreements for the Supply of Fissionable, Source and Other Materials	3 July 1958	Brazil Canada Greece Hungary India Union of Soviet Socialist Republics United Kingdom of Great Britain and Northern Ireland United States of America	Brazil Canada Greece Hungary India Union of Soviet Socialist Republics United Kingdom of Great Britain and Northern Ireland United States of America
Committee on Non-Governmental Organizations	15 January 1959	Czechoslovak Socialist Republic El Salvador France Greece India Union of Soviet Socialist Republics United Kingdom of Great Britain and Northern Ireland United States of America	France Greece India Mexico Poland Union of Soviet Socialist Republics United Kingdom of Great Britain and Northern Ireland United States of America
Technical Assistance Committee	19 January 1959	Argentina Brazil Canada Colombia Czechoslovak Socialist Republic France Hungary India Japan South Africa	Argentina Brazil Canada Colombia Denmark France Hungary India Indonesia Japan Poland South Africa

Title	Established	Composition	
		1961-62	1962-63
		Sweden Thailand Union of Soviet Socialist Republics United Kingdom of Great Britain and Northern Ireland United States of America Viet-Nam	Union of Soviet Socialist Republics United Kingdom of Great Britain and Northern Ireland United States of America Viet-Nam
Administrative and Budgetary Committee	19 January 1959	Brazil Canada Czechoslovak Socialist Republic France Germany, Federal Republic of India Japan South Africa Union of Soviet Socialist Republics United Kingdom of Great Britain and Northern Ireland United States of America	Brazil Canada France India Italy Japan Poland South Africa Union of Soviet Socialist Republics United Kingdom of Great Britain and Northern Ireland United States of America

ANNEX II

OUTSTANDING CONTRIBUTIONS TO THE 1958, 1959, 1960, 1961 AND 1962 REGULAR BUDGETS

Member	1958	1959	1960	1961	1962	Total
	$	$	$	$	$	$
Argentina	-	-	42 311	63 530	67 219	173 060
Brazil	-	-	-	-	3 006	3 006
Bulgaria	-	-	-	-	452	452
China	-	-	-	-	304 544	304 544
Colombia	-	-	-	14 486	18 997	33 483
Congo (Leopoldville)	-	-	-	-	682	682
Cuba	-	3 572	13 439	14 186	15 111	46 308
Dominican Republic	-	-	-	2 261	3 316	5 577
Ecuador	-	-	-	-	378	378
El Salvador	-	-	-	-	2 655	2 655
Ethiopia	-	-	-	2 176	3 316	5 492
Guatemala	-	-	-	-	2 579	2 579
Haiti	-	2 021	2 337	2 467	2 652	9 477
Honduras	1 635	2 090	2 337	2 467	2 652	11 181
Hungary	-	-	-	20 826	26 475	47 301
Liberia	-	-	-	-	2 652	2 652
Mali	-	-	-	-	188	188
Nicaragua	-	-	1 899	2 467	2 652	7 018
Paraguay	1 636	2 090	2 337	2 467	2 652	11 182
	3 271	9 773	64 660	127 333	462 178	667 215

ANNEX III

ADVANCES TO THE WORKING CAPITAL FUND

Member	Assessed	Paid	Outstanding
	$	$	$
Afghanistan	1 000	1 000	-
Albania	800	800	-
Argentina	18 600	18 600	-
Australia	30 800	30 800	-
Austria	8 400	8 400	-
Belgium	22 200	22 200	-
Brazil	19 000	19 000	-
Bulgaria	3 800	3 800	-
Burma	1 200	1 200	-
Byelorussian Soviet Socialist Republic	9 600	9 600	-
Cambodia	800	800	-
Canada	57 800	57 800	-
Ceylon	1 600	1 600	-
Chile	4 800	4 800	-
China	84 600	84 600	-
Colombia	4 800	4 800	-
Congo (Leopoldville)	1 200	1 200	-
Cuba	4 000	4 000	-
Czechoslovak Socialist Republic	21 600	21 600	-
Denmark	10 800	10 800	-
Dominican Republic	1 000	1 000	-
Ecuador	1 200	1 200	-
El Salvador	800	800	-
Ethiopia	1 000	1 000	-
Finland	6 800	6 800	-
France	109 800	109 800	-
Germany, Federal Republic of	105 400	105 400	-
Ghana	1 600	1 600	-
Greece	4 200	4 200	-
Guatemala	1 000	1 000	-
Haiti	800	800	-
Holy See	800	800	-
Honduras	800	800	-
Hungary	10 400	10 400	-
Iceland	800	800	-
India	37 600	37 600	-
Indonesia	8 400	8 400	-
Iran	3 800	3 800	-
Iraq	1 600	1 600	-
Israel	2 800	2 800	-
Italy	41 400	41 400	-
Japan	42 000	42 000	-
Korea, Republic of	3 600	3 600	-
Lebanon	1 000	1 000	-
Luxembourg	1 000	1 000	-

Member	Assessed	Paid	Outstanding
	$	$	$
Mali	800	800	-
Mexico	13 600	13 600	-
Monaco	800	800	-
Morocco	2 600	2 600	-
Netherlands	18 600	18 600	-
New Zealand	7 600	7 600	-
Nicaragua	800	800	-
Norway	8 400	8 400	-
Pakistan	7 800	7 800	-
Paraguay	800	-	800
Peru	1 800	1 800	-
Philippines	7 400	7 400	-
Poland	23 600	23 600	-
Portugal	3 000	3 000	-
Romania	6 000	6 000	-
Senegal	1 000	1 000	-
South Africa	9 800	9 800	-
Spain	16 000	16 000	-
Sudan	1 200	1 200	-
Sweden	24 000	24 000	-
Switzerland	17 600	17 600	-
Thailand	3 000	3 000	-
Tunisia	1 000	1 000	-
Turkey	7 400	7 400	-
Ukrainian Soviet Socialist Republic	36 600	36 600	-
Union of Soviet Socialist Republics	277 000	277 000	-
United Arab Republic	4 600	4 600	-
United Kingdom of Great Britain and Northern Ireland	140 200	140 200	-
United States of America	640 400	640 400	-
Venezuela	9 600	9 600	-
Viet-Nam	3 000	3 000	-
Yugoslavia	7 000	7 000	-
	2 000 000	1 999 200	800
New Members			
Bolivia	800	800	-
Liberia	800	-	800
Saudi Arabia	1 200	1 200	-
Syrian Arab Republic	1 000	-	1 000
Uruguay	2 000	-	2 000
	5 800	2 000	3 800

ANNEX IV

CONTRIBUTIONS TO THE 1963 REGULAR BUDGET

Member	Assessed	Credits	Paid	Balance
	$	$	$	$
Afghanistan	3 561	179	-	3 382
Albania	2 849	143	-	2 706
Argentina	66 239	-	-	66 239
Australia	109 687	8 698	42 522	58 467
Austria	29 915	935	28 980	-
Belgium	79 060	6 595	72 465	-
Brazil	67 664	-	-	67 664
Bulgaria	13 533	-	-	13 533
Burma	4 273	498	-	3 775
Byelorussian Soviet Socialist Republic	34 188	384	-	33 804
Cambodia	2 849	143	2 706	-
Canada	205 840	9 929	195 911	-
Ceylon	5 698	568	5 130	-
Chile	17 094	-	1 158	15 936
China	301 282	-	-	301 282
Colombia	17 094	-	-	17 094
Congo (Leopoldville)	4 273	-	-	4 273
Cuba	14 245	-	-	14 245
Czechoslovak Socialist Republic	76 923	-	26 524	50 399
Denmark	38 462	2 296	36 166	-
Dominican Republic	3 561	-	-	3 561
Ecuador	4 273	-	-	4 273
El Salvador	2 849	-	-	2 849
Ethiopia	3 561	-	-	3 561
Finland	24 216	3 397	20 819	-
France	391 025	44 467	346 558	-
Germany, Federal Republic of	375 356	8 987	183 185	183 184
Ghana	5 698	-	5 698	-
Greece	14 957	751	14 206	-
Guatemala	3 561	-	-	3 561
Haiti	2 849	-	-	2 849
Holy See	2 849	143	2 706	-
Honduras	2 849	-	-	2 849
Hungary	37 037	-	-	37 037
Iceland	2 849	143	-	2 706
India	133 903	17 832	116 071	-
Indonesia	29 915	-	1 866	28 049
Iran	13 533	-	679	12 854
Iraq	5 698	286	5 412	-
Israel	9 972	218	9 754	-
Italy	147 436	7 564	69 936	69 936
Japan	149 573	5 326	144 247	-
Korea, Republic of	12 820	926	-	11 894
Lebanon	3 561	-	3 561	-
Luxembourg	3 561	502	3 059	-

Member	Assessed	Credits	Paid	Balance
	$	$	$	$
Mali	2 849	-	-	2 849
Mexico	48 433	1 665	35 581	11 187
Monaco	2 849	143	2 706	-
Morocco	9 259	465	-	8 794
Netherlands	66 239	3 407	62 832	-
New Zealand	27 066	1 641	25 425	-
Nicaragua	2 849	-	-	2 849
Norway	29 915	2 349	27 566	-
Pakistan	27 778	829	26 949	-
Paraguay	2 849	-	-	2 849
Peru	6 410	214	-	6 196
Philippines	26 353	2 171	24 182	-
Poland	84 046	6 563	42 600	34 883
Portugal	10 684	1 467	9 217	-
Romania	21 367	2 850	9 258	9 259
Senegal	3 561	179	3 382	-
South Africa	34 900	4 906	29 994	-
Spain	56 980	4 556	-	52 424
Sudan	4 273	-	4 273	-
Sweden	85 470	6 635	-	78 835
Switzerland	62 678	3 511	59 167	-
Thailand	10 684	536	10 148	-
Tunisia	3 561	198	3 355	8
Turkey	26 353	-	26 353	-
Ukrainian Soviet Socialist Republic	130 342	1 816	-	128 526
Union of Soviet Socialist Republics	986 466	13 285	-	973 181
United Arab Republic	16 382	2 801	-	13 581
United Kingdom of Great Britain and Northern Ireland	499 287	29 995	469 292	-
United States of America	2 280 625	123 506	-	2 157 119
Venezuela	34 188	1 150	-	33 038
Viet-Nam	10 684	1 467	9 217	-
Yugoslavia	24 929	403	11 963	12 563
	7 122 500	339 618	2 232 779	4 550 103
New Members				
Bolivia	2 849	-	2 281	568
Liberia	2 849	-	-	2 849
Saudi Arabia	4 273	-	4 273	-
Syrian Arab Republic	3 561	-	-	3 561
Uruguay	7 123	-	-	7 123
	20 655	-	6 554	14 101

ANNEX V

VOLUNTARY CONTRIBUTIONS TO THE GENERAL FUND

A. For 1963

Member	Contribution pledged (equivalent in United States dollars at Technical Assistance Board rates)	Paid $
Argentina	a/	-
Australia	20 000	20 000
Austria	5 000	5 000
Brazil	19 000 b/	-
Burma	1 000 c/	-
Canada	57 800 b/	-
China	5 000	-
Denmark	10 800 b/	10 800
Finland	6 800 b/	-
Germany, Federal Republic of	105 400 b/	52 700
Ghana	2 500 b/	-
Greece	4 200 b/	4 200
Holy See	2 000 b/	2 000
India	25 000 c/	25 000
Indonesia	2 000	-
Iraq	2 000 b/	-
Israel	2 222 c/	-
Italy	41 400 b/	-
Japan	28 000	28 000
Korea, Republic of	3 000	-
Mexico	13 000	13 000
Monaco	2 000) b/ 40 816 c/) b/	-
Netherlands	18 600 b/	18 600
Norway	8 400 b/	-
Pakistan	6 000 c/	6 000
Philippines	4 000 c/	4 000
Portugal	3 600 b/	3 600
South Africa	9 800 bc/	-
Sweden	24 000 b/	-
Switzerland	16 203 c/	16 203
Thailand	3 000 b/	3 000
Turkey	4 444 c/	4 444
United Arab Republic	11 500 bc/	11 500
United Kingdom of Great Britain and Northern Ireland	144 000 bc/	144 000
United States of America	500 000	-
Yugoslavia	7 000 bc/	-
	1 159 485	372 047
United States of America (matching contribution)	159 485 bd/	-
	1 318 970	372 047

a/ Amount to be announced later.

b/ Pledge based on a percentage equal to or higher than the Member's assessment under the Regular Budget.

c/ Pledge announced in local currency.

d/ A matching contribution of dollar for dollar of the total contributions above $1 million, until a total of $1.5 million is reached.

B. For 1962

Member	Contribution pledged (equivalent in United States dollars at Technical Assistance Board rates)	Paid $
Argentina	15 000	-
Australia	20 000	20 000
Austria	5 000	5 000
Belgium	10 000	10 000
Brazil	18 800	18 800
Burma	1 000	1 000
Canada	57 000	57 000
China	5 000	5 000
Colombia	2 000	-
Denmark	11 000	11 000
Finland	6 600	6 600
France	30 612	30 612
Germany, Federal Republic of	65 000	65 000
Ghana	2 500	2 500
Greece	2 500	2 500
Holy See	2 000	2 000
India	25 000	25 000
Indonesia	2 000	-
Iraq	2 000	2 000
Israel	2 222	2 222
Italy	41 000	41 000
Japan	28 000	28 000
Korea, Republic of	3 000	3 000
Lebanon	1 000	1 000
Mexico	8 500	8 500
Monaco	42 816	42 816
Morocco	2 600	2 600
Netherlands	18 600	18 600
Norway	9 000	9 000
Pakistan	6 000	6 000
Philippines	4 000	4 000
Portugal	3 600	3 600
South Africa	10 400	10 400
Spain	10 000	-
Sweden	25 600	25 600

Member	Contribution pledged (equivalent in United States dollars at Technical Assistance Board rates)	Paid $
Switzerland	11 628	11 628
Thailand	3 000	3 000
Turkey	4 444	4 444
United Arab Republic	11 261	11 261
United Kingdom of Great Britain and Northern Ireland	144 000	144 000
United States of America	500 000	500 000
Venezuela	9 200	9 200
Viet-Nam	952	952
Yugoslavia	6 400	6 400
	1 190 235	1 161 235
United States of America (matching contribution)	190 235	150 000
	1 380 470	1 311 235

ANNEX VI

A SUMMARY OF WORK CARRIED OUT IN THE LABORATORIES

I. Physics

1. The world-wide significance of the Agency's distribution service of calibrated radioactive solutions is shown by the following figures [1]; a total number of 1142 radionuclides was distributed to 103 scientific institutions in 40 Member States, i.e.:

Member State	Number of samples	Member State	Number of samples
Argentina	16	Japan	201
Australia	20	Lebanon	2
Austria	3	Mexico	16
Belgium	10	Morocco	6
Bulgaria	34	Netherlands	37
Canada	37	New Zealand	6
China	30	Norway	13
Czechoslovak Socialist Republic	14	Pakistan	24
Denmark	17	Philippines	10
Finland	5	Poland	9
France	6	Portugal	1
Germany, Federal Republic of	9	Romania	47
Ghana	18	Sweden	15
Greece	47	Switzerland	32
Hungary	25	Turkey	12
India	19	United Arab Republic	12
Indonesia	9	United Kingdom of Great Britain and Northern Ireland	9
Iraq	5	United States of America	162
Israel	71	Viet-Nam	11
Italy	76	Yugoslavia	46

II. Chemistry

2. Six general analytical techniques (spectrophotometry, activation analysis, polarography, emission spectrography, mass spectrometry and special ion exchange separations) were studied, developed and put into operation for the determination of uranium and trace elements in nuclear materials.

3. In connection with the international comparison of analytical techniques for nuclear materials, the first preliminary programme involving nine laboratories has been completed, the results (550 in all) analysed and a report issued. The second intercomparison has also been started and the sample, a solution of uranyl nitrate containing nine important trace elements, has been dispatched to laboratories in 16 countries. The Laboratory has completed its determinations of eight of the elements by absorption spectrophotometry.

4. Assistance in chemical matters has been given to other sections of the laboratories. This includes water resources development (determination of microelements in a series of Turkish waters), whole-body counter (preparation and determination of thorium compounds), agriculture (determination of N^{15} contents by mass spectrometry), the International Laboratory of Marine Radioactivity in Monaco (investigation into the determination of microelements in sea water) and safeguards (the determination of uranium).

[1] These figures represent the results of this activity for the calendar year 1963.

5. Approximately 50 experiments of tritium enrichment in hydrogen by gas chromatography have led to the establishment of good experimental conditions for this separation for a sample size of 100-150 ml of hydrogen. Experiments to allow an increase of size are under way.

III. Environmental radioactivity analysis

6. 1500 radionuclide determinations have been carried out at the request of ten Member States in the course of development work and of the training of fellows. Sixteen different nuclides of biological importance were determined in samples of rain, snow, surface or ground water, air filters, food, animal bones and urine.

7. The following intercomparison samples were analysed for Sr^{90}, Cs^{137}, stable Ca, Sr and total K: dried milk, wheat, fish meal and animal bone ash. Sub-samples were distributed to 20 laboratories in 15 Member States for the intercomparison of radionuclide determination techniques. A sample of condensed milk spiked with I^{131} was analysed and sub-samples distributed to 15 laboratories in 12 Member States.

8. In addition to the in-service training of ten fellows from eight Member States, ten fellows from ten Member States were selected to take part in a four-week training course in bio-assay techniques which will take place in Seibersdorf and Vienna in November 1963.

9. In connection with WMO's plan for the measurement of atmospheric radioactivity a study was made on the efficiency of various air-filtering media for the collection of radioactive materials from air. A report on the results of this study was forwarded to WMO. Since interest in this study was expressed also by ENEA, a copy was made available to this organization.

IV. Agriculture

10. In connection with the co-ordinated research contract programme on the efficiency of fertilizer applications in rice cultivation, 2700 determinations of P^{31} and P^{32} were carried out on plant samples submitted by the various participating countries. On the other hand, 450 pot experiments were carried out for the determination of P^{31} and P^{32} in soils and plants coming from these countries.

11. Preliminary work has been done for the establishment of analytical techniques to be used by the contractors of the forthcoming co-ordinated research programme on maize and rice cultivation. About 100 plant samples having assimilated fertilizers labelled with N^{15} were analysed for their content in N^{15}.

V. Hydrology

12. Equipment for measuring natural levels of tritium in precipitation is now developed to the stage of routine use. It consists of two portions, a gas counter working in the proportional region and a set of one-stage electrolysis cells for preliminary enrichment when this is required.

13. To prepare the filling for the gas counter, water samples of volume 5 ml are first reduced to hydrogen in a furnace filled with magnesium at 600°C. This hydrogen is then added to ethylene in near-stoichiometric proportions and the mixture converted to ethane using a palladium catalyst. With a filling of 70 cm of ethane the background of the counter in a 5 cm thick lead shield is 1.16 count per minute. A count rate of one count per minute is obtained from samples containing 170 tritium units. Thus samples containing tritium of this order of activity can be counted without any preliminary enrichment.

14. The eight electrolysis cells are constructed of cylindrical, concentric, stainless-steel tubes and they are cooled in separate metal tanks, containing coolant at -5°C. The initial electrolyte concentration is one per cent by weight of Na_2O_2. With a volume reduction from 250 ml to 12 ml, the tritium concentration is increased about ten times; this volume reduction takes approximately 80 hours.

15. This apparatus is used routinely for measuring tritium in precipitation samples in the joint Agency/WMO project to investigate world-wide water circulation patterns, and for samples taken in connection with research contracts and Special Fund projects.

16. Work is continuing on possibilities of improving the sensitivity and speed of the above described methods by working at higher pressures and by using different techniques of synthesizing the filling gas and a second stage of larger electrolysis cells to increase the concentration factor.

VI. Whole-body counting

17. The equipment has been put into routine and effective operation. A very successful stabilization system has been built for improving the performance of the gamma ray spectrometer. Calibrations have been performed on about 20 persons for the assay of Cs^{137} and K^{40}, using the short-lived isotopes Cs^{132} and K^{42}, and techniques have been further tested with other isotopes. Measurements have been conducted on three thorium plant workers, two radiochemists, and five thorotrast cases. Training has been provided for three physicists from Member States.

VII. Electronics

18. Without mentioning the working time used for service and maintenance of electronic equipment of the entire Laboratory and for the development and construction of smaller items such as pre-amplifiers, power packs, current and voltage stabilizers, timing circuits etc., a number of larger projects were undertaken as for instance the development of a low background G-M counter, a low background scintillation counter (fully transistorized), a time to pulse-height converter (time range: nanoseconds - seconds), and a 4pi-beta-gamma coincidence counter with short dead time in the beta-channel and low level discriminator (fully transistorized). Apparatuses with such performances are not commercially available.

19. At the beginning of September 1962, a long-term programme was started which is aimed at gradually replacing the apparatuses fitted with electronic tubes previously built in the Laboratory by fully transistorized equipment, if possible from a technical point of view. This is intended to avoid additional expenses for brand new equipment.

VIII. International Laboratory for Marine Radioactivity in Monaco

(a) Hydrography and marine chemistry studies

20. Several day and/or night cruises were made with oceanographic research vessels of the Institut océanographique for hydrographical measurements, chemical sampling, biological sampling, and light-scattering measurements to study the particulate content of sea water. Tracer dye experiments were made for the study of mixing and advection. Chemical analyses, including the use of atomic absorption spectroscopy, were made for Cu, Zn, Cr, Fe, Mn, Ni, Sr, silicates, salinity and oxygen. Papers were written on the surface currents of the Ligurian Sea, and on the Cu and Zn contents of Ligurian Sea water.

(b) Marine ecology

21. Animal populations of plankton and benthos were followed through one annual cycle to determine seasonal fluctuations. Quantitative studies for the calculation of biomass and production, studies of the vertical migrations of deep-sea plankton and nekton and of food

chains of deep-sea organisms, and studies of the feeding of invertebrates using radionuclide tracers were started. A paper was written on the comparison of the benthic communities of the Eastern and Western Mediterranean Sea.

(c) Radiochemistry

22. A microtechnique for Cr analysis in marine organisms was developed and used in connection with marine radiobiological studies. The formation of Cr-precipitates in sea water and the adsorption of Cr on sea sediments were studied. Experimental studies were carried out on chelate formation of Cr with organic molecules in sea water, on the behaviour of Zn, Cd, Co, Sr and other elements in sea water, and on the distribution of these elements in marine biota and sediments. A paper was written on the Sr^{90} content of marine organisms.

(d) Radiobiology

23. The uptake of Cr by diatoms and the uptake, accumulation and loss of Cr by lamellibranch mollusc was investigated, using Cr^{51} tracer. Experiments were also made on the uptake, accumulation, retention and loss of Cr^{51}, Zn^{65} and $Zr\text{-}Nb^{95}$ by phytoplankton, lamellibranch mollusc, benthic filter-feeding animals, copepods, and fish. Papers were written on the uptake of Cr^{51} by marine organisms and on the use of various concentration factors to describe the uptake of radioactive elements by marine organisms.

(e) Radiation biophysics

24. Continuous-flow aquarium systems were constructed and experiments begun on the concentration of radioisotopes by fish eggs, and the effects of low-level radioactivity on fish eggs, on the ability of fish to reproduce, and on other marine flora and fauna. An experimental survey was made and a paper written on the present radioactive content of selected marine organisms in the coastal zone of Monaco.

ANNEX VII

CONFERENCES, SEMINARS AND SYMPOSIA

A. Held in 1962

Date	Title	Place	Co-sponsoring organizations
Conference			
4-9 June	Conference on the Corrosion of Reactor Materials	Salzburg, Austria	
Seminars			
16 July-25 August	Seminar on Theoretical Physics	Trieste, Italy	
5-9 November	Seminar on the Practical Applications of Short-lived Radioisotopes Produced in Small Research Reactors	Vienna	
Symposia			
26 February-2 March	Symposium on the Use of Radioisotopes in Soil-Plant Nutrition Studies	Bombay, India	FAO
7-11 May	Symposium on Radiation Damage in Solids and Reactor Materials	Venice, Italy	
14-18 May	Symposium on Reactor Safety and Hazards Evaluation Techniques	Vienna	
21-25 May	Symposium on the Thermodynamics of Nuclear Materials	Vienna	
2-6 July	Symposium on Biological Effects of Ionizing Radiation at the Molecular Level	Brno, Czechoslovak Socialist Republic	
10-14 September	Symposium on Inelastic Scattering of Neutrons in Solids and Liquids	Chalk River, Canada	UNESCO
8-13 October	Symposium on the Treatment and Storage of High-level Radioactive Wastes	Vienna	
19-23 November	Symposium on Radioactive Dating	Athens	
10-14 December	Symposium on Neutron Detection, Dosimetry and Standardization	Harwell, United Kingdom	

B. Programme for 1963

Date	Title	Place	Co-sponsoring organizations
Conferences			
27-31 May	Conference on the Application of Large Radiation Sources in Industry	Salzburg, Austria	
4-8 June	Conference on Operating Experience with Power Reactors	Vienna	
1-5 July	Conference on New Nuclear Materials Technology, with Special Reference to Non-Metallic Fuel Elements	Prague	
Symposia			
5-9 March	Symposium on the Application of Radioisotopes in Hydrology	Tokyo	
11-15 March	Symposium on Criteria for Guidance in the Selection of Sites for the Construction of Reactors and Nuclear Research Centres	Bombay, India	
22-26 April	Symposium on the Use and Application of Radioisotopes and Radiation in the Control of Plant and Animal Insect Pests	Athens	FAO
26-31 August	Symposium on Radiological Health and Safety in Nuclear Materials Mining and Milling	Vienna	ILO WHO
2-6 September	Symposium on Exponential and Critical Experiments	Amsterdam	
7-11 October	Symposium on Biological Effects of Neutron Irradiations	Brookhaven National Laboratories, United States	
11-15 November	Symposium on Physics and Material Problems of Reactor Control Rods	Vienna	
9-13 December	Symposium on Isotope Mass Effects in Chemistry and Biology	Vienna	ICSU

ANNEX VIII

AGENCY PUBLICATIONS[a]

1. Proceedings of Conferences, Symposia, Seminars and Panels[b]

Biological Effects of Ionizing Radiation at the Molecular Level
Corrosion of Reactor Materials, two volumes
Diagnosis and Treatment of Radioactive Poisoning
Inelastic Scattering of Neutrons in Solids and Liquids, two volumes
Neutron Dosimetry, two volumes
Plasma Physics and Controlled Nuclear Fusion Research, second and third part
Production and Use of Short-lived Radioisotopes from Reactors, two volumes
Programming and Utilization of Research Reactors, three volumes[c]
Radiation Damage in Reactor Materials
Radiation Damage in Solids, three volumes
Radioisotopes in Soil-Plant Nutrition Studies
Radioactive Dating
Reactor Safety and Hazards Evaluation Techniques, two volumes
Selected Topics in Nuclear Theory
Theoretical Physics
Thermodynamics of Nuclear Materials
Treatment and Storage of High-level Radioactive Wastes
Use of Radioisotopes in Animal Biology and the Medical Sciences, two volumes[c]

2. Technical Directories

Directory of Nuclear Reactors, Vol. IV: Power Reactors

3. Safety Series

No. 1 Safe Handling of Radioisotopes (revised edition)[d]
No. 7 Regulations for the Safe Transport of Radioactive Materials: Notes on Certain Aspects of the Regulations[e]
No. 8 The Use of Film Badges for Personnel Monitoring[f]
No. 9 Basic Safety Standards for Radiation Protection[d]
No. 10 Disposal of Radioactive Wastes into Fresh Water[g]

4. Review Series

No. 23/24 Chemical Processing of Uranium Ores - Tratamiento de minerales de uranio
No. 25 Fabrication of Fuel Elements
No. 26 Analytical Criticality Studies Associated with Neutron Diffusion Theory
No. 27 Radioactive Isotope Therapy, with Particular Reference to the Use of Radiocolloids

5. Bibliographical Series

No. 8 Semiconductor Nuclear Particle Detectors
No. 9 Radioisotopes and Ionizing Radiations in Entomology

6. Technical Reports Series

No. 8	Single-field Isodose Charts for High-energy Radiation - An International Guide
No. 9	IAEA Research Contracts - Second Annual Report[d/]
No. 10	Medical Uses of Calcium-47
No. 11	Application of Isotope Techniques in Hydrology
No. 12	Light Water Lattices
No. 13	Nuclear Electronic Instruments in Tropical Countries[g/]
No. 14	The Uranium-Carbon and Plutonium-Carbon Systems - A Thermochemical Assessment
No. 15	A Basic Toxicity Classification of Radionuclides
No. 16	IAEA Research Contracts - Third Annual Report

7. Journals

Nuclear Fusion - Journal of Plasma Physics and Thermonuclear Fusion, Volume II, Nos. 1-4 (two issues), Volume III, No. 1
Atomic Energy Review, Volume I, Nos. 1 and 2
International Atomic Energy Agency Bulletin, four issues[d/]

8. Miscellaneous

Conferences, Meetings, Training Courses in Atomic Energy, Nos. 19-24
List of References on Nuclear Energy, Volume 4, Nos. 13-24; Volume 5, Nos. 1-12
List of References on Nuclear Energy, Index 1959-1961
List of Bibliographies on Nuclear Energy (with annotations), Volume 2
List of Periodicals in the Field of Nuclear Energy (revised edition)
The Fellowship Programme in Nuclear Science[d/]
Publications Catalogue, No. 5: Publications in the Nuclear Sciences, 1963

---

a/ Published in English, unless otherwise indicated.

b/ Contributions published in the original language (English, French, Russian or Spanish) with abstracts in English, French, Russian and Spanish. Discussions in English.

c/ Published for the Agency by the Academic Press.

d/ Published in English, French, Russian and Spanish.

e/ Published in Russian and Spanish.

f/ Published in French, Russian and Spanish.

g/ Published in English and French.