UNITED NATIONS

GENERAL ASSEMBLY

Distr.
GENERAL

A/5491
10 September 1963

ORIGINAL: ENGLISH

Eighteenth session

# THIRD INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY

## Report of the Secretary-General

1. At its seventeenth session, the General Assembly adopted resolution 1770 (XVII) which, inter alia, requested the Secretary-General, "with the assistance of the United Nations Scientific Advisory Committee, in co-operation with the International Atomic Energy Agency and in consultation with interested specialized agencies: to prepare plans and proceed with arrangements for a third International Conference on the Peaceful Uses of Atomic Energy to be held at Geneva for ten calendar days in the autumn of 1964". The resolution also stipulated that this third Conference should be considerably more limited in size and cost than the two conferences on the peaceful uses of atomic energy held in 1955 and 1958, and "at a minimum expense to the United Nations". This report is submitted in pursuance of the further provision in the resolution that the Secretary-General is to "report to the General Assembly at its eighteenth session so that the necessary funds" for the Conference may be provided.

2. Accordingly, I called the United Nations Scientific Advisory Committee into meetings in New York on 25 and 26 April 1963 to advise me on plans for the Conference. The meeting was attended by the Director-General of the International Atomic Energy Agency (IAEA) and representatives of the interested specialized agencies.

3. Thorough consideration was given to the various difficulties which would confront the Conference if it were held in 1964, two of which are the heavy conference schedule of the European Office and certain other large meetings which are being held in the Geneva area at the same time. Nevertheless, it was agreed that the Conference could be held between 31 August and 9 September 1964, in accordance with the wish of the General Assembly.

4. The Committee also formulated an agreed topical agenda for the Conference. The agenda and the resolution adopted by the General Assembly have been circulated to States Members of the United Nations and members of the specialized agencies and of IAEA, as enclosures of the letters of invitation. The letters and the enclosures are annexed to the present report.

5. The Committee also discussed means of keeping the size and expense of the Conference to a minimum, but concluded that it would be impractical to envisage a conference much smaller than the first one held in 1955, at which 450 papers were presented orally. Elaboration of a detailed Conference programme must await the receipt of papers and abstracts from participating member States. It was considered highly desirable to have one or two free afternoons in the programme for informal discussions and spontaneous meetings.

6. The Committee devoted considerable attention to the question of the Secretary-General of the Conference and other staffing arrangements. The appointment of a Conference Secretary-General will be further considered at the autumn meeting of the Committee. All preparatory work that could be undertaken thus far has been done with the collaboration of the IAEA.

7. It was agreed that IAEA should have a major role in the preparation and servicing of the Conference, especially with regard to providing scientific staff and in the selection, review and editing of papers. The Conference Secretary-General would be expected to work very closely with IAEA at all stages of the preparation of the Conference.

8. The Committee also discussed the question of exhibits at the Conference, and the policy was established that member States wishing to provide exhibits must defray their full cost. Further consideration is being given to the space required for exhibits and to suitable sites for exhibits.

9. As to the question of publication of papers and of the proceedings of the Conference, which is a major item of cost, the Committee recognized the necessity to find ways and means of reducing translation and printing costs. This question will be pursued at the meeting of the Committee on 5 November 1963.

10. The Advisory Committee will meet again in New York on 5 November 1963.

11. Budget estimates on the cost of the Conference are being submitted to the General Assembly in a separate report.

ANNEX

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EXECUTIVE OFFICE OF THE SECRETARY-GENERAL

EC 721 3rd 31 July 1963

Sir,

1. I have the honour, in pursuance of resolution 1770 (XVII) adopted by the General Assembly on 29 November 1962, to invite your Government to participate in the Third United Nations International Conference on the Peaceful Uses of Atomic Energy. A copy of the resolution is enclosed (Enclosure I).

2. As recommended by the United Nations Scientific Advisory Committee, the Conference is to be held in Geneva, Switzerland, from 31 August to 9 September 1964 inclusive, at the Palais des Nations.

3. The following additional actions affecting the organization and procedure of the Conference have been taken:

a) A provisional topical agenda, constituting the general programme of the Conference, has been prepared by the Scientific Advisory Committee with the co-operation of the International Atomic Energy Agency (Enclosure II).

b) It has been decided to hold a scientific exhibition in connexion with the Conference, which will be directly related to the subject of the Conference. Participation in the exhibition will be limited to States taking part in the Conference. The cost of each exhibition will be borne by the exhibiting State concerned.

4. It is expected that the rules of procedure of the Conference will, (subject to the limitation of documents mentioned below,) in general follow those of the second United Nations International Conference on the Peaceful Uses of Atomic Energy. The rules of procedure and further information on the scientific exhibition will be transmitted in due course.

5. Paragraph 3 (b) of resolution 1770 (XVII) requests that provision be made "for a conference considerably more limited in size and cost than those held in 1955 and 1958, and at minimum expense to the United Nations". The translation and reproduction of contributed papers and the publication of the Conference proceedings constituted the largest part of the expenses of the previous conferences. Since it is likely that even more States will wish to submit scientific papers to the forthcoming Conference, the publication of papers will be possible under the terms of the General Assembly resolution only if certain of the costs are borne by States submitting papers and if the general rules for the limitation of documents are observed. On the advice of the Scientific Advisory Committee, it is accordingly proposed that the number of papers be reduced by using survey papers to a greater extent than at the previous conferences. Such survey papers might cover all of the activities in a particular State relating to a given topic of the Agenda; no State should, however, contribute more than one, or in exceptional cases two survey papers on any one topic. It is hoped that the total number of papers contributed to the Conference will not exceed the corresponding figure for the First United Nations International Conference on the Peaceful Uses of Atomic Energy, namely, approximately 1,000. It is expected, nevertheless, that the greater use of survey papers will make it possible for States that have started scientific work on particular topics since 1955 to submit detailed papers on those topics. Participating States are also requested to provide each abstract and each paper in at least two of the

working languages of the Conference (English, French, Russian and Spanish). Further details on these points will be included in notes for the guidance of authors and those responsible for preparing papers.

6. Titles and abstracts (300-500 words) of all papers intended to be presented at the Conference should be submitted to the Secretariat of the Third United Nations International Conference on the Peaceful Uses of Atomic Energy, not later than 1 February 1964, while the full texts of the papers themselves (which should not exceed 5,000 words) should be submitted not later than 1 May 1964.

7. Paragraph 4 of resolution 1770 (XVII) invites participating States "to include among their representatives individual experts competent in the field of atomic energy". Further particulars concerning representation will be included in the rules of procedure.

8. It will be appreciated if your Government, within a reasonable period of time, will submit the necessary information as to the nature and probable number of papers relating to the agenda of the Conference which it may intend to provide.

9. I would also be grateful to receive, at an early date, word of your Government's intention with regard to participation in the Conference in response to this invitation.

Accept, Sir, the assurances of my highest consideration.

U Thant
Secretary-General

UNITED NATIONS NATIONS UNIES

NEW YORK

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EXECUTIVE OFFICE OF THE SECRETARY-GENERAL

EC 721 3rd

31 July 1963

1. I refer to the projected third United Nations International Conference on the Peaceful Uses of Atomic Energy to be held in pursuance of General Assembly resolution 1770 (XVII) adopted by the General Assembly on .... 29 November 1962, a copy of which is enclosed (Enclosure I).

2. In pursuance of the above-mentioned resolution of the Assembly, I invite the participation of your Organization in the Third United Nations International Conference on the Peaceful Uses of Atomic Energy which, as recommended by the United Nations Scientific Advisory Committee, will be held in Geneva, Switzerland, from 31 August to 9 September 1964 inclusive, at the Palais des Nations.

3. The following actions affecting the organization and procedure of the Conference have been taken:

a) A provisional topical agenda, constituting the general programme of the Conference, has been prepared by the Scientific Advisory Committee with the co-operation of the International Atomic .... Energy Agency (Enclosure II).

b) It has been decided to hold a scientific exhibition in connexion with the Conference, which will be directly related to the subject of the Conference. Participation in the exhibition will be limited to States taking part in the Conference. The cost of each exhibition will be borne by the exhibiting State concerned.

4. It is expected that the rules of procedure of the Conference will, (subject to the limitation of documents mentioned below,) in general follow those of the second United Nations International Conference on the Peaceful Uses of Atomic Energy. The rules of procedure and further information on the scientific exhibition will be transmitted in due course.

5. Paragraph 3 (b) of resolution 1770 (XVII) requests that provision be made "for a conference considerably more limited in size and cost than those held in 1955 and 1958, and at minimum expense to the United Nations". With this end in view the invitation to States to participate includes the following paragraph: "The translation and reproduction of contributed papers and the publication of the Conference proceedings constituted the largest part of the expenses of the previous conferences. Since it is likely that even more States will wish to submit scientific papers to the forthcoming Conference, the publication of papers will be possible under the terms of the General Assembly resolution only if certain of the costs are borne by States submitting papers and if general rules for the limitation of documents are observed. On the advice of the Scientific Advisory Committee, it is accordingly proposed that the number of papers be reduced by using survey papers to a greater extent than at the previous conferences. Such survey papers might cover all of the activities in a particular State relating to a given topic of the Agenda; no State should, however, contribute more than one, or in exceptional cases two survey papers on any one topic. It is hoped that the total number of papers contributed to the Conference will not exceed the corresponding figure for the First United Nations International Conference on the Peaceful Uses of Atomic Energy, namely, approximately 1,000. It is expected, nevertheless, that the greater use of survey papers will make it possible for States that have started scientific work on particular topics since 1955 to submit detailed papers on those topics. Participating States are also requested to provide each

abstract and each paper in at least two of the working languages of the Conference (English, French, Russian and Spanish). Further details on these points will be included in notes for the guidance of authors and those responsible for preparing papers."

6. Titles and abstracts (300-500 words) of all papers intended to be presented at the Conference should be submitted to the Secretariat of the Third United Nations International Conference on the Peaceful Uses of Atomic Energy, not later than 1 February 1964, while the full texts of the papers themselves (which should not exceed 5,000 words) should be submitted not later than 1 May 1964.

7. To the extent of your Organization's interest in this Conference, I cordially invite your co-operation and I, or the Conference Secretary-General, when appointed, and his assistants, will be happy to consult with you on any aspect of the matter as plans for the Conference develop.

Yours sincerely,

U Thant
Secretary-General

ENCLOSURE I

# GENERAL ASSEMBLY RESOLUTION 1770 (XVII)

## THIRD INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY

Adopted by the General Assembly at its 1179th plenary meeting on 29 November 1962

The General Assembly,

Noting that the General Conference of the International Atomic Energy Agency, on 26 September 1962, expressed the belief that a third International Conference on the Peaceful Uses of Atomic Energy should be held,

Recalling the benefits that have flowed from the two International Conferences on the Peaceful Uses of Atomic Energy, organized by the United Nations and held at Geneva in 1955 and 1958,

Believing that the expeditious and effective application of atomic energy to peaceful purposes should be actively promoted,

Recognizing that international meetings provide effective opportunities for the dissemination of scientific information on the application of atomic energy to peaceful purposes,

Noting that, by 1964, six years will have elapsed since the last International Conference on the Peaceful Uses of Atomic Energy,

Recalling the report of the Secretary-General[1/] evaluating the Second United Nations International Conference on the Peaceful Uses of Atomic Energy in relation to the holding of similar conferences in

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1/ Official Records of the General Assembly, Fifteenth Session, Annexes, agenda item 25, document A/4391 and Add.1.

the future, and in particular the views expressed by the United Nations Scientific Advisory Committee in paragraph 15 of that report,

Convinced that, because of improved dissemination of knowledge of the peaceful uses of atomic energy, a technical conference considerably more limited in size and cost than those held in 1955 and 1958 would be adequate,

Believing that such a conference would now be desirable,

1. Declares its continued interest in promoting the application of atomic energy to peaceful purposes;

2. Declares that a third International Conference on the Peaceful Uses of Atomic Energy would be advantageous in achieving these objectives and should accordingly be convened under the aegis of the United Nations;

3. Requests the Secretary-General, with the assistance of the United Nations Scientific Advisory Committee, in co-operation with the International Atomic Energy Agency and in consultation with interested specialized agencies;

(a) To prepare plans and proceed with arrangements for a third International Conference on the Peaceful Uses of Atomic Energy to be held at Geneva for ten calendar days in the autumn of 1964;

(b) To provide for a conference considerably more limited in size and cost than those held in 1955 and 1958 and at a minimum expense to the United Nations;

(c) To report to the General Assembly at its eighteenth session so that the necessary funds for such a conference may be approved for inclusion in the United Nations budget;

4. Invites the States Members of the United Nations and members of the specialized agencies or of the International Atomic Energy Agency to participate in the Conference and to include among their representatives individual experts competent in the field of atomic energy.

ENCLOSURE II

# PROVISIONAL TOPICAL AGENDA FOR THE THIRD INTERNATIONAL CONFERENCE ON THE PEACEFUL USES OF ATOMIC ENERGY

## GENERAL SESSIONS

### Session A. Opening of Conference

### Session B. New Economic Data. Energy Needs in Coming Years and the Role of Nuclear Power in Meeting these Needs

Six or seven papers will be invited from countries having relatively well-established plans for the introduction and utilization of nuclear power in the next decade. During this plenary session a survey of those papers will be made, followed by a panel discussion on the subject.

### Session C. International Collaboration in Nuclear Reactor Projects including Developments of Major Co-operative Installations

This session should deal with bilateral and multilateral co-operative programmes involving the construction or development of nuclear power stations; basic research towards power technology, power surveys, site studies, etc.

### Session D. Research Reactors

Papers should discuss the objectives of the utilization of research reactors and the ways and means of meeting these objectives, including such aspects as organization, and collaboration with scientific and technical institutions. During this session a survey of the papers presented will be made, followed by a panel discussion on the subject.

Session E. Controlled Nuclear Fusion

Summary papers will be invited in which recent research and results in controlled nuclear fusion should be described. No detailed technical papers would be accepted for this session. Rapporteurs will be invited to review the summaries submitted.

Summary papers could be prepared for oral presentation by the authors and should discuss the status of controlled fusion research in:

1. North America
2. Soviet Union
3. Western Europe
4. Other parts of the world.

A panel of 4 to 6 persons will discuss the status and future prospects for fusion power. Participation from delegates from the Conference floor will be encouraged.

Session F. Applications of Isotopes and Radiation Sources in the Physical Sciences

Survey papers will be invited on the following subjects dealing with the use of isotopes and radiation sources in the physical sciences:

(a) Use of tracers and of large radiation sources in physical and chemical research;

(b) Use of tracers and of large radiation sources in industrial processes;

(c) Use of tracers in hydrology.

Session G. Applications of Isotopes and Radiation Sources in the Life Sciences
Radiobiology

Survey papers will be invited on the following subjects dealing with the use of isotopes in the life sciences:

(a) Use of tracers and of radiation sources in medicine;

(b) Use of tracers and of large radiation sources in agriculture;

(c) Use of tracers in biology.

Summary papers will be invited to discuss new information on the biological effects of radiation with application to radiobiological safety. No detailed technical papers will be invited, and rapporteurs will be invited to review the summaries submitted.

Session H. Closing Session

## Parallel Technical Sessions

## Series I

### Sessions 1.1., 1.2., 1.3. and 1.4. Power Reactors

Papers and discussions should deal with information available on the problems involved in the design, construction and operation of power reactors, as a result of the experience and/or study of reactors in operation, reactor types under development and proposed future designs. Special attention should be given to cost aspects, new technical design features of power reactor systems and problems encountered during construction and commissioning of power reactor generating stations. Papers may also discuss the general development of reactor technology and expected future trends in these developments. A few papers by the most advanced countries on their assessment of the economic future of the main power reactor systems might also be submitted.

Reactor types to be discussed would include:

(a) Gas-cooled reactors;
(b) Heavy water reactors;
(c) Light water reactors (pressurized, boiling water or graphite moderated);
(d) Organic-moderated and cooled reactors;
(e) Sodium-cooled thermal reactors;
(f) Breeders (fast and thermal reactors);
(g) Spectral shift reactors;
(h) Small power reactors and portable power reactor plants;
(i) Propulsion reactors for maritime or other applications;
(j) Power sources for space applications;
(k) Other advanced design concepts or special applications of power reactors.

### Session 1.5. Integration of Nuclear Power within Existing Power Networks: Economic and Technical Aspects

This item should cover the general problem of nuclear power stations considered within power systems, the operation and cost of which are being substantially influenced by the appearance of power reactors. It should deal further with methods used for complex cost comparisons between sequences of nuclear power stations and of conventional power stations.

### Session 1.6. Direct conversion of heat to electricity for large and small systems including isotopic power sources for space and other applications

The latest developments in thermionic, thermo-electric, magneto-hydrodynamic devices, etc., should be dealt with, but only if related to nuclear energy.

Session 1.7. Reactors as heat sources

The use of reactors for production of heat for industrial purposes, desalination, domestic heating etc. should be dealt with.

Session 1.8. High and Very High Flux Research and Test Reactors

Papers should describe specific features of design of high flux research and test reactors (with neutron flux of the order of $10^{14}$), special provisions made for obtaining high flux regions and experiments and tests being carried out or planned, as well as experience gained from the operation and experimental utilization of such reactors.

Concerning very high flux reactors, papers should describe reactors in the design, construction or operation stages aimed at obtaining very high neutron fluxes for research by using various special techniques or reactor types, such as:

external beams of large intensity
flux traps; external "flux traps";
radially graded fuel concentration
increase of the surface-area-to-volume ratio and the maximum permissible heat flux
tangential beams delivery
highly loaded fluid-fuel reactors
very dilute, large core reactors, etc.

Papers are also invited on design of experimental equipment and experiments utilizing very high flux research reactors in such operations as the production of trans-uranium isotopes, high resolution analysis of crystallographic magnetic and liquid structures, fast neutron radiation effects on basic physical and engineering materials and measurement of the fundamental vibration spectra of crystalline materials.

Session 1.9. Basic Power Reactor Engineering

(a) Heat transfer problems. Papers should discuss the basic theoretical problems of and experimental results on the heat transfer of various reactor coolants such as water, steam, gases, sodium, organics, etc. Presentation of original designs of such reactor components as fuel elements, steam generators, etc. elaborated for meeting high heat flux requirements could also be made.

(b) Hydraulic problems. Papers should deal with the theoretical study of experiments with power reactor hydrodynamics of various coolants, describing the theoretical methods and their experimental checks by the use of special mock-ups and reactor commissioning tests.

(c) Reactor Power Station Components. Papers should discuss the design and construction considerations applied to a power reactor system and the operating experience gained with various reactor power station components, such as pressure vessels, cores, control rod systems, pumps, heat exchangers, etc.

## Series 2

### Sessions 2.1., 2.2. Fuel Fabrication

Papers should deal with recent developments in production of fissile materials for fuel elements and reactor cores (metal, alloys, cermet, etc.) in cladding of fuel elements, etc., studying and testing of chemical, physical, mechanical and other properties of fuel materials from the point of view of their utilization in nuclear reactors with high temperature, high burn-up, etc. Technology of fabrication, study and testing of properties and behaviour of fuel elements and reactor cores, inside and outside of the reactor should also be dealt with.

### Session 2.3. Radiation Behaviour, Fluid Fuel and Containment

Papers on radiation behaviour topics should deal with fundamental studies of effect of radiation on fuel and structural materials, radiation damage under operation conditions and problems related to radiation behaviour.

Papers on fluid fuel should deal with developments and perspectives of utilization of fluid metals (molten metals, salts, etc.) and studies and tests of chemical, physical and other properties of such materials from the point of view of their utilization in nuclear reactors and problems of containment of fluid fuels.

### Session 2.4. Corrosion Studies, Non-destructive Testing of Fabricated Fuel Elements

Papers on corrosion should deal with fundamental studies on corrosion of fuel and structural materials, corrosion behaviour

(under operating reactor conditions) of fuel and structural materials and problems of corrosion and deposition on fuel rod cladding in reactor operation. Protection from corrosion in reactor operation and problems related to corrosion should also be dealt with.

The papers on Non-destructive Testing should deal with recent developments and improvements in methods and techniques for determination of bonding and fuel dispersion as well as total fuel, fission product and plutonium content.

Session 2.5. Economics of the Fuel Cycle

Papers should cover the cost of all aspects of fuelling a nuclear power plant, including fabrication of fuel assemblies, cost of material destroyed, cost of spent fuel processing, shipping and insurance charges, fuel inventory or carrying charges, and any credit accruing due to production of U-233 or plutonium. Reporting of costs actually experienced would be valuable, as well as predicted trends in fuel cycle costs in the future.

Sessions 2.6., 2.7. Fuel Reprocessing

The papers on this topic should deal with the following subjects:

1. Aqueous Reprocessing. Extraction processes, chemistry of extraction processes, ion-exchange processes, precipitation processes.

2. Non-aqueous Processing. Metal distillation, liquid metal and molten salts, halide distillation, metal reconstitution, other non-aqueous processes.

3. Fission Production Recovery. Chemical technology of separation of fission products (Sr, Cs, Ce, Pm, etc.); Technology of preparation of large radiation sources.

Session 2.8. Reactor Materials

In this session recent developments in production materials for moderator and reactor structure components (metal alloys, ceramic etc.) should be described. The study and testing of chemical, physical, mechanical and other properties of these materials from the point of

view of their utilization in nuclear reactors with high temperature, high burn-up, etc. should be dealt with. Papers should also be prepared dealing with the technology of fabrication, testing properties and behaviour of moderator and structure components and the economic factors associated with the procurement and fabrication of r eactor materials.

Sessions 2.9 and 2.10. Uranium and thorium reserves related to requirements, future development and exploration

Papers should deal with surveys of national resources of uranium and thorium ores in terms of tonnage, grade and recoverable uranium content, calculated on the basis of costs of production and recovery of uranium and thorium values within the range: (a) of accepted world prices; and (b) of acceptable national prices.

The subject should also include estimates of requirements of uranium and thorium for national atomic energy programmes to the end of the century; relation of available national reserves to requirements; survey of probable international resources of uranium and thorium in ore reserves and their relation to probable international requirements to the end of the century; significant new developments in prospecting techniques for uranium and thorium and in techniques of recovering uranium and thorium from their ores.

## Series 3

Session 3.1. New Developments in Reactor Physics

Papers prepared for this session should be concerned with neutron kinetics in reactor systems including fast reactor, interaction of neutrons with reactor materials involved in slowing down, thermalization and energy spectrum changes; advance in transport and neutron diffusion theories.

Session 3.2 Reactor Performance Studies

In this session it is proposed to deal with lattice studies and critical experiments; calculation of reactor performance e.g. reactivity, power and temperature coefficients, burn-up, transient poisons, shielding design and neutron spectra.

Session 3.3. Reactor Kinetics, Principles and System of Control

Papers should deal with reactor kinetics ; physics of control systems with special reference to control rods, their worth, methods of control rod calculations, flux pattern, flattening, etc.; Reactor control, treatment of kinetic equations and applications to the reactor control; study of the stability (methods); automatic control; setting up of control systems; computer studies of reactor dynamics; training simulators, data processing; reactor operation optimisation.

A critical evaluation of nuclear cross section data will be prepared as a survey paper by the International Atomic Energy Agency. This will include a digest of current compilations of cross-section data with special emphasis on those isotopes and elements of general interest in reactor design (fuel moderators, structural materials, etc.)

Session 3.4. Reactor Safety; Location and Containment; Reactor Tests

Papers should deal with the ensuring of safety by design and construction, control devices and by administrative measures. Other aspects which could be dealt with would include national practices and experience in siting reactors, hazards and safety evaluation, reactor accidents and incidents, estimation of fission product release following accidents and methods adopted for reducing hazards to the population following fission product release. Safety aspects of nuclear propelled ship operation may also be dealt with, including evaluation of canals, ports and harbours used by nuclear propelled ships.

Session 3.5. Chemical processing plant safety; Fuel transport

Papers should cover four sub-sections; relationship between siting and process and design features; criticality control with regard to: plant design according to the process involved, operational aspects, storage of fuel; storage and disposal of waste, airborne hazards control; operational experience including a review of hazardous incidents which have occurred.

A limited number of review papers will be accepted dealing with containment, shielding and criticality control problems.

Session 3.6. Nuclear Safety Research

Papers should deal essentially with the nuclear safety aspects of reactor transient testing, reactor kinetics theory, fuel coolant interaction, and fission product behaviour associated with fuel melt down.

Papers may also be submitted dealing with loss of coolant tests and destructive tests applicable to power reactors.

Session 3.7. Rescue and Salvage under Condtions of High Radiation Fields and Radioactive Contamination: Environmental Aspects of Large Scale Use of Atomic Energy.

Papers should review past experience including, in particular, administrative organization, monitoring of rescue personnel; handling and care of highly irradiated and contaminated persons; special instrumentation (high range survey meters; criticality alarm systems, remote handling devices, television techniques, etc.).

A few review papers would consider probable future atmospheric contamination due to fuel treatment (Kr.85), space activities (SR.90) and transuranic elements; Marine contamination, build up of terrestrial contamination by long-life isotopes and likely effects of large scale use of atomic energy on genetic load of populations will also be dealt with.

Session 3.8. Radioactive waste management.

Experience in the management of radioactive wastes since 1958 may be summarized by four survey papers, viz., waste management experience in Asia, USSR, Europe and North America. Papers on the management of low-level wastes should be focussed on the development of incineration as a treatment process for solid and organic wastes selective absorption processes, optimisation of treatment systems and economics. Interest in the management of high-level wastes should be focussed on the technical and economic evaluation of storage. Recent developments in the study of the fate of radioactive materials in the earth's environment may also be considered.

Session 3.9. Isotope Separation

The session on isotope separation will be divided into three sections. In the first section special emphasis will be placed on U-235 production, using all important separation methods and on economic aspects of U-235 utilization in nuclear energy. The second section will deal with all problems of heavy water separation, properties of deuterium

compounds, and use of deuterium oxide in reactor technology. The third section will deal with separation of other isotopes of importance in radioisotope production.

Subjects dealing with theoretical and practical aspects of uranium isotope separation should include: Diffusion and thermal diffusion methods, centrifuges separation, electromagnetic and other methods, and economic problems of utilization of U-235 in reactor technology.

Heavy water production and separation of hydrogen isotopes should include: Low temperature distillation methods, chemical exchange isotope separation processes (including catalytic exchange), electrolytic process for heavy water concentration, miscellaneous processes and economic aspects of heavy water production and $D_2O$ utilization in reactor technology.

Session 3.10. Miscellaneous New Applications of Atomic Energy

Papers would deal with civil engineering applications of atomic energy, chemical applications of radiation, etc.

## General Sessions

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| Session A. | Opening of Conference |
| Session B. | New Economic Data, Energy Needs in Coming Years, and the Role of Nuclear Power in Meeting these Needs. |
| Session C. | International collaboration in Nuclear Research Projects including Developments of Major Co-operative Organizations. |
| Session D. | Research Reactors. |
| Session E. | Controlled Nuclear Fusion |
| Session F. | Applications of Isotopes and Radiation Sources in the Physical Sciences |
| Session G. | Applications of Isotopes and Radiation Sources in the Life Sciences. Radiobiology. |
| Session H. | Closing session |

## Parallel Technical Sessions

### Series 1.

| | |
|---|---|
| Sessions 1.1..1.2. 1.3..1.4. | Power Reactors |
| Session 1.5. | Integration of nuclear power within existing power networks; Economic and technical aspects. |
| Session 1.6. | Direct conversion of heat to electricity for large and small systems including isotopic power sources for space and other applications. |
| Session 1.7. | Reactors as heat sources. |
| Session 1.8. | High and very high flux research and test reactors. |
| Session 1.9. | Basic power reactor engineering. |

### Series 2.

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| Sessions 2.1..2.2. | Fuel fabrication. |
| Session 2.3. | Radiation behaviour. Fluid fuel and containment. |
| Session 2.4. | Corrosion studies. Non-destructive testing of fabricated fuel elements. |
| Session 2.5. | Economics of the Fuel Cycle. |
| Sessions 2.6..2.7. | Fuel Reprocessing. |
| Session 2.8. | Reactor materials. |
| Sessions 2.9..2.10. | Uranium and thorium reserves related to requirements, future development and exploration. |

Series 3.

| | |
|---|---|
| Session 3.1. | New developments in reactor physics. |
| Session 3.2. | Reactor Performance Studies |
| Session 3.3. | Reactor kinetics, Principles and System of Control. |
| Session 3.4. | Reactor Safety; location and containment; Reactor Tests. |
| Session 3.5. | Chemical Processing Plant Safety; Fuel Transport |
| Session 3.6. | Nuclear Safety Research. |
| Session 3.7. | Rescue and Salvage under Conditions of High Radiation Fields and Radioactive Contamination: Environmental Aspects of Large Scale use of Atomic Energy. |
| Session 3.8. | Radioactive Waste Management. |
| Session 3.9. | Isotope Separation. |
| Session 3.10. | Miscellaneous New Applications of Atomic Energy. |

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