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REPORT OF THE REGIONAL EXPERT GROUP MEETING FOR THE UNITED NATIONS  
CONFERENCE FOR THE PROMOTION OF INTERNATIONAL CO-OPERATION IN  
THE PEACEFUL USES OF NUCLEAR ENERGY \*/

(Santiago, Chile, 15-18 April 1985)

\*/ This document was previously circulated in the Preparatory Committee for the United Nations Conference for the Promotion of International Co-operation in the Peaceful Uses of Nuclear Energy, Sixth Session, Vienna, 21 October-1 November 1985 (A/CONF.108/PC/15).



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## I. ORGANIZATION OF THE MEETING

1. As part of the preparations for the United Nations Conference for the Promotion of International Co-operation in the Peaceful Uses of Nuclear Energy, a meeting of experts from Latin America and the Caribbean was convened at Santiago, Chile, from 15 to 18 April 1985.

### A. Attendance

2. Ten experts from eight countries in the region participated in the meeting in an individual capacity. Observers from the following regional organizations also attended the meeting: Association of Latin American Societies of Biology and Nuclear Medicine (ALASBINM), Commission of Regional Electrical Integration (CIER), Inter-American Nuclear Energy Commission (IANEC) and Agency for the Prohibition of Nuclear Weapons in Latin America (OPANAL). The list of participants is annexed to the present report.

3. The secretariats of the United Nations Conference for the Promotion of International Co-operation in the Peaceful Uses of Nuclear Energy and of the Economic Commission for Latin America and the Caribbean (ECLAC) were also represented.

### B. Election of officers

4. Mr. Jorge Servian was elected Chairman, Messrs. Enrique Gillmore Callejas and Harry Skeete Vice-Chairmen, and Mr. Roberto Trevino Rapporteur.

### C. Adoption of the work programme

5. The following work programme was adopted:

1. Opening and organization of the meeting and adoption of the work programme.

2. The promotion of international co-operation in the peaceful uses of nuclear energy in Latin America and the Caribbean:

(a) Current and projected developments in the peaceful uses of nuclear energy in the light of needs and priorities in the region:

(i) Role of nuclear power for economic and social development;

(ii) Role of other peaceful applications of nuclear energy for economic and social development;

(b) Existing and foreseeable constraints in the introduction and development of peaceful uses of nuclear energy;

(c) Suggestions regarding practical measures and effective ways and means of promoting international co-operation in the peaceful uses of nuclear energy for economic and social development.

3. Consideration and adoption of the report of the meeting.

D. Opening statements

6. The meeting was opened by the Deputy Executive Secretary of ECLAC, Mr. Roberto T. Brown, who made some brief observations on the general focus of international co-operation which the Commission believed to be of interest to the Latin American and Caribbean region. The area of regional and inter-regional co-operation, both in terms of horizontal co-operation and technical and financial co-operation as vehicles for economic and social development, was of the highest priority in the Commission's work programme. Hence, the Commission warmly welcomed and endorsed the practical initiative of suggesting specific steps to promote international co-operation in the specific sphere of peaceful uses of nuclear energy.

7. He stated that the meeting offered an opportunity to suggest practical and effective measures for promoting such co-operation, adding that questions to be considered included identification of obstacles to the development of peaceful nuclear capabilities that could be surmounted through international co-operation. On the basis of successful experiences accumulated in a limited number of fields, it was to be expected that the range of activities could be progressively expanded. The Deputy Executive Secretary hoped that the meeting would provide a useful forum for exploring means of promoting regional and international co-operation in peaceful uses of nuclear energy, as they apply to the economic and social development needs and situation in Latin America and the Caribbean.

8. The Personal Representative of the Secretary-General of the United Nations and Secretary-General of the Conference, Mr. Amrik S. Mehta, briefly outlined the background and genesis of the Conference, recalling that the question of convening an international conference under the auspices of the United Nations system, aimed at promoting international co-operation in the peaceful uses of nuclear energy for economic and social development, had first been considered by the General Assembly at its thirty-second session, when, in its resolution 32/50 of 8 December 1977, the Assembly had spelt out four principles on the subject. At the same time, the General Assembly had invited all States, as well as the international organizations concerned, to respect and observe those principles. Since then, the General Assembly had each year reaffirmed the principles and provisions of its resolution 32/50, which formed in effect the basis for the Conference. At subsequent sessions, the General Assembly had repeatedly emphasized the importance of proper and adequate preparations for the Conference and had requested all States, the International Atomic Energy Agency (IAEA), the specialized agencies and other relevant organizations of the United Nations system to co-operate actively and contribute effectively to the preparations for the Conference. It was particularly important that contributions from Member States and from the international organizations should reflect a common purpose and direction as an integral part of the preparations as a whole, all oriented specifically to the purpose, aims and objectives of the Conference, thus giving the input documentation for the Conference an essential sense of harmony and cohesion.

9. He noted that the General Assembly, in its most recent resolution on the subject (resolution 39/74 of 13 December 1984), had invited the relevant organizations to ensure that their contributions to the input documents for the Conference, including the reports of the expert group meetings, should be concise and comprehensive and specifically related to the purpose, aims and objectives of the Conference, including, in particular, suggestions regarding practical and effective ways and means for the promotion of international

co-operation in the peaceful uses of nuclear energy, so as to achieve meaningful results from the Conference in accordance with the objectives of General Assembly resolution 32/50.

10. In reviewing the preparatory process as a whole, he indicated that the expert group meeting essentially had a three-phased task, starting with an analysis and evaluation of the current situation and projected developments in nuclear power and other peaceful applications of nuclear energy, in the light of national programmes, needs and priorities in the region. The next phase related to existing and foreseeable constraints in the introduction and development of peaceful uses of nuclear energy, and major areas of concern might be considered under such headings as financing arrangements, infrastructure and organizational set-up, manpower training, research and development support, access to technology and know-how, assurance of the supply of material, equipment and services, industrial support, technical assistance, public information etc. The third phase concerned specific initiatives to overcome such constraints and suggestions regarding practical measures and effective ways of promoting international co-operation in the field. The latter phase represented the key issue and constituted, in effect, the essence of the task before the meeting.

11. The Conference was of singular importance, in that it would represent the first international effort of its kind designed exclusively for the purpose of promoting international co-operation in the peaceful uses of nuclear energy for economic and social development. It should not therefore be confused with or looked upon as one of a series of conferences held in the past which were essentially concerned with technical aspects and the status of the technology for the peaceful uses of nuclear energy. The purpose and nature of the Conference being quite distinct from those of other conferences, it was of fundamental importance that the preparatory process should be seen in its proper perspective and, given the aims and objectives of the Conference, all preparatory work should be oriented specifically to the central issue of the promotion of international co-operation.

12. The Attaché to the President of the Nuclear Energy Commission of Chile and Head of International Relations of the Commission, Mr. Enrique Gillmore Callejas, welcomed the participants to the meeting. Chile had great expectations from the Conference and hoped that the meeting would produce useful results in the interests of countries in the region.

#### E. Adoption of the report

13. The Group held eight plenary sessions and adopted its report on 18 April 1985.

### II. PROCEEDINGS

14. The meeting recalled General Assembly resolution 32/50, in which the Assembly declared that:

"(a) The use of nuclear energy for peaceful purposes is of great importance for the economic and social development of many countries;

"(b) All States have the right, in accordance with the principle of sovereign equality, to develop their programme for the peaceful use of nuclear technology for economic and social development, in conformity with their priorities, interests and needs;

"(c) All States, without discrimination, should have access to and should be free to acquire technology, equipment and materials for the peaceful use of nuclear energy;

"(d) International co-operation in the field covered by the present resolution should be under agreed and appropriate international safeguards applied through the International Atomic Energy Agency on a non-discriminatory basis in order to prevent effectively proliferation of nuclear weapons."

Further, the meeting noted that, in that resolution, the General Assembly had invited all States, as well as the international organizations concerned, to respect and observe the principles set forth therein. States had also been invited to strengthen the existing IAEA programmes for the development of the peaceful use of nuclear energy in the developing countries, the acquisition of installations, equipment and nuclear materials and information and the training of personnel in the peaceful use of nuclear energy.

15. In the light of the above resolution, the meeting proceeded with its work programme as follows.

A. Current and projected developments in the peaceful uses of nuclear energy in the light of needs and priorities in the region

16. As part of its preparations for the meeting, ECLAC had reviewed the institutional framework of the nuclear sector, and the current status and potential development of power and non-power applications of nuclear energy in a number of Latin American and Caribbean countries.\*

1. Nuclear power

17. The Latin American and Caribbean countries differed greatly with respect to territory, population and level of economic development. Some of them had reached a certain degree of industrial development, others were only partially industrialized, while the economy of another group was based almost exclusively on agriculture. Some countries enjoyed abundant natural, human and energy (oil, coal and water) resources, others did not. Only two countries in the region had nuclear power plants in operation or under construction and had achieved a good level of technological and industrial development. Two other countries were currently installing nuclear reactors for power production. However, these countries were reviewing their plans to pursue further consistent and long-term nuclear power programmes.

18. The remaining countries had not taken nuclear power into account in their plans for national energy programmes and generally agreed that the nuclear option was not justified in the near future, but could become an attractive alternative towards the beginning of the next century. Most countries, however, intended to provide themselves with the necessary tools to define the best policies of expansion and interconnection within which the nuclear power component could be considered. As for uranium resources, explorations carried out to varying degrees by countries in the region had not led thus far to the identification of any important uranium deposits or to the formulation of precise - rather than just tentative - estimates.

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\*Two background studies prepared by consultants; some papers were also submitted by experts.

19. There had been a certain degree of regional co-operation among countries active in the nuclear power field, and in the use of training and research reactors through bilateral agreements or with the technical assistance of IAEA. There was general interest in the introduction of nuclear energy for power production through the use of small and medium-power reactors, in the expansion and interconnection of regional and sub-regional power grids and in studies on medium and long-term energy planning.

## 2. Other peaceful uses of nuclear energy

20. The uses of nuclear energy in medicine, biology, agriculture, fisheries, industry, hydrology, research and development etc. were considered. In general, nearly all countries had used nuclear energy in some of those fields and it could be said that, either through their energy institutions or through universities, hospitals, scientific and technological institutes etc., different human and material infrastructures had been established, which had allowed a certain level of development in each of them.

21. Among current co-operation programmes, reference was made to those proposed by the States members of the Regional Co-operation Arrangements for the Advancement of Nuclear Science and Technology in Latin America (ARCAL), especially in medicine, agriculture, biology, physics, chemistry, research reactors and applied analytical techniques.

### (a) Health and medicine

22. There was a fairly widespread use of radioisotopes and radiation for diagnosis and therapy in Latin America and the Caribbean, although the levels of development attained varied from country to country. A series of technical co-operation programmes had contributed significantly to the existing situation, the participation of IAEA being of major importance. The activities of other international organizations such as the United Nations Development Programme (UNDP), the World Health Organization/Pan American Health Organization (WHO/PAHO) and the Inter-American Nuclear Energy Commission (IANEC), had also been important, as had bilateral agreements among countries both within and outside the region. In nuclear medicine, ALASBINM, which was not an official entity, had done significant work.

23. The fields generally identified as priority areas which, through co-ordinated actions at the regional level, should receive special attention on the short and medium-term were:

(a) Training of human resources;

(b) Supply of radionuclides, radiomedications and reagents, from production centres in the region, both horizontally and vertically;

(c) Construction of basic detection equipment that would promote the horizontal dissemination of nuclear medicine;

(d) Establishment of programmes specifically oriented to the maintenance of equipment and instruments, to quality control procedures, and to the attainment of greater service efficiency;

(e) Promotion of co-ordinated research programmes on parasitic diseases of high incidence in the region, such as the "Chagas" disease.

(b) Agriculture

24. A number of countries in the region had made advances in agriculture using nuclear techniques, through the implementation of projects designed to ensure optimal utilization of fertilizers, of induced mutations for the improvement of seeds, and of associated harvest systems in regions with limited rainfall and chronic plant diseases. Other applications in the diagnosis of cattle pregnancy, vaccine development, pest eradication programmes etc. were also mentioned. The dissemination of the use of nuclear techniques in all countries nevertheless needed to be fostered, with a view to increasing agricultural production, improving distribution, reducing harvest losses to a minimum, increasing storage periods etc. The Food and Agriculture Organization of the United Nations (FAO), IAEA, IANEC, and other agencies had jointly provided considerable assistance to the countries of the region. Starting in 1985, assistance would be obtained in particular through some of the projects identified by ARCAL.

(c) Food

25. Food preservation was of utmost importance for the countries of Latin America and the Caribbean, and could help to solve food availability problems and facilitate the export of agriculture commodities.

(d) Hydrology

26. The management and rational use of water in all countries of Latin America and the Caribbean was of paramount importance from the agricultural, industrial and urban point of view. Therefore, for several decades, activities in that field had included the use of nuclear techniques to help solve problems related to water resources. IAEA had an important part in those activities through the supply of equipment, experts and personnel training. In addition, bilateral technical assistance programmes had been carried out.

(e) Industry

27. The use of isotopes and radiation for industrial purposes had reached a fairly high level of application in the region, and almost all countries used nuclear techniques in industry. The experts favoured maximum possible dissemination of techniques that could be used in industry. Both the technical assistance provided by IAEA and bilateral co-operation programmes should envisage all radioisotopic and instrumental techniques and non-destructive testing.

28. The peaceful uses of nuclear energy in areas other than power production in Latin America and the Caribbean could be said to range from a non-existent or meagre development to advanced utilization. The situation offered very good prospects for regional and international technical co-operation co-ordinated by IAEA and regional bodies, since there was a potential for undertaking new programmes and expanding existing ones under appropriate mechanisms.

B. Existing and foreseeable constraints in the introduction and development of peaceful uses of nuclear energy

29. The meeting noted that the ESCAP regional meeting had identified the following areas of constraints in the introduction and development of nuclear power and other applications of nuclear science and technology:

finance, development and organization of infrastructure, manpower training, transfer of technology, assurance of supply, technical and economic questions, and public acceptance. Using those as a starting point, the participants reviewed the range of issues that conditioned and limited the application of nuclear technology in the countries of Latin America and the Caribbean. It was agreed that the constraints identified by the ESCAP meeting were generally applicable. The question was raised, however, of the criteria to be used to define the key constraints with sufficient precision to provide a constructive basis for making recommendations, under the next item on the work programme, on practical measures and effective ways and means for promoting regional and international co-operation as a vehicle for overcoming such constraints.

30. The discussion focused on the relative importance of the constraints according to: (a) the stage of development of nuclear technology and characteristics of the individual countries; (b) the point in the economic development process at which the constraint manifested itself; and (c) the susceptibility of any particular constraint to be dealt with at the national level or through regional and international co-operation. It was reiterated that the current status of the development of nuclear technology in the region varied widely from one country to another, which in turn meant that the obstacles indicated below were not necessarily the same in all countries. Recognizing the great diversity among countries, three types of nuclear energy situations were identified: incipient development of nuclear technology with very limited supporting industrial and technical infrastructure; intermediate development of technology with partial supporting industrial and technical infrastructure; and advanced technology with a more highly developed supporting industrial and technical infrastructure. With respect to the points within the socio-economic system at which any constraint might take effect, four levels were identified: policy formulation; programming; policy and project implementation; and production, distribution and consumption of goods and services. In the discussion of the constraints, it was decided to group them as follows:

(a) Financing

- (i) High and increasing investment costs for power plants;
- (ii) High content of imported components with an adverse effect on the balance of payments;
- (iii) The adverse effects on countries with more advanced nuclear power programmes of the general economic situation and the external debt, forcing those countries to delay or cancel their programmes;
- (iv) The obvious lack of willingness on the part of credit institutions to finance nuclear power projects;
- (v) Uncertainty regarding investment values, accentuated by internal inflation in many of the countries of the region;
- (vi) Insufficiency of funds both of national origin and from international bodies to finance research programmes to develop and apply non-power nuclear techniques, to train manpower and to ensure exchange of information and access to it;

(b) Infrastructure and organization

- (i) In many cases, the lack of assessment and planning capability, which made it difficult to undertake the necessary long-term planning; inappropriate programmes frequently hampered the extension of the peaceful uses of nuclear energy to all social strata and systems of production of goods and services, particularly in the field of health;
- (ii) The lack of industrial support, which was a serious drawback in the planning and implementation of nuclear power projects and caused problems during plant operation;
- (iii) Small national grid sizes coupled with unavailability of small and medium-sized nuclear power plants at a reasonable cost, which negatively affected the introduction of nuclear power in national energy programmes;
- (iv) Inadequate capability for maintenance of equipment;
- (v) Limited research and development facilities;
- (vi) Inadequate international assistance to promote industrial application in developing countries;
- (vii) Inadequate regional and international mechanisms for scientific and technological co-operation;

(c) Manpower

- (i) Manpower for the execution of the various phases of implementation of nuclear programmes - planning, contracting, installation and operation - which was in short supply and was not properly utilized;
- (ii) The scarcity of trained personnel, aggravated by emigration, job instability and low salary and wage levels;
- (iii) Insufficient availability of professionals familiar with the safe use of isotope applications and radiations, and a shortage of hospital physicists;

(d) Research and development support

- (i) Insufficient research and development support, which created problems both at the planning and operational stages of activities related to nuclear energy;
- (ii) Under-utilization of equipment due to difficulty of maintenance, lack of parts or inability to repair it;
- (iii) Frequent changes in technical staff, creating difficulties in terms of the continuity and effective use of international co-operation;
- (iv) Resources wasted as a result of the purchase of unsuitable equipment or poor selection of equipment;

(e) Access to technology and know-how

Insufficient access by countries beginning to develop peaceful uses of nuclear energy to the technology and technical know-how they needed and an insufficient flow of technical knowledge and information towards those countries

(f) Assured supply of materials, equipment and services

Difficulties in ensuring access to the necessary equipment, parts, fuel and services affected the development of activities related to nuclear energy, in particular in the area of nuclear power generation

(g) Industrial support

A lack of adequate industrial support, which made the cost of constructing facilities and maintaining equipment exceedingly high and could result in the acquisition of turn-key projects with a large proportion of imported components and little national participation and non-acquisition of technical know-how

(h) Technical assistance

An imbalance between the magnitude of the region's needs and the resources available to international bodies to implement programmes

(i) Flow of information

(i) Difficulties in the exchange of information on the nuclear activities of the countries of the area, causing problems in terms of co-operation and greater utilization of the resources available to the region;

(ii) An insufficient flow of information to the public on the high levels of security observed in the utilization of nuclear technology

### III. CONCLUSIONS

31. As a result of its deliberations, the group of experts suggested the following measures, which could be applied, depending on the circumstances of each country, to overcome the constraints to the introduction and development of peaceful uses of nuclear energy and for promoting regional and international co-operation in this field:

(a) Considering the important role that the World Bank and regional banks (such as the Inter-American Development Bank) play in the development of energy resources in developing countries, these banks should include the nuclear power option in their country energy assessments and make provisions for long-term loans on easy terms for nuclear power plants in their energy-financing programmes;

(b) ECLAC, in collaboration with the international organizations concerned, such as UNDP, UNIDO, FAO, WHO and IAEA and relevant financial institutions, should take an active and effective role in mobilizing financial and technical resources, and organizing and supervising such co-operative

efforts as may be considered necessary in support of member States in the region in the initiation and expansion of activities related to nuclear power and nuclear applications in food and agriculture, animal sciences, industry and health for economic and social development. In order to assist countries with little or no installed capacity, special arrangements should be made through horizontal co-operation within the region;

(c) Financial support from national and international institutions should be made available on favourable terms to producers of nuclear equipment and technology in developing countries, who should also be granted the assistance necessary to enable them to offer trade conditions competitive with those of enterprises situated in developed countries;

(d) International bodies should substantially increase the funds earmarked for technical co-operation with developing countries;

(e) International support should be provided for the development of indigenous capability in assessment and planning, and in the design, construction, installation, operation and maintenance of nuclear power plants and related facilities by countries in the region, as well as for other nuclear applications;

(f) The international agencies should provide support for national centres that have reached the level necessary to act as regional centres, which could carry out training programmes on the application of nuclear techniques in the region and facilitate the transfer of technology in specific areas;

(g) Efforts should be made to promote greater co-ordination of technical co-operation programmes among international and regional agencies;

(h) Efforts should be made to foster greater co-ordination among the national organizations of the various countries of a region in order to ensure better use of existing capabilities;

(i) International agencies should give favourable consideration to providing support to regional bodies so that the latter can carry out specific horizontal technical co-operation activities in their areas of competence. In addition, regional bodies should give priority to co-operation with countries in greater need of assistance;

(j) International action should be taken to:

- (i) Explore the possibility of connecting and extending electric power networks;
- (ii) Improve the distribution of informative material on nuclear energy and technology in order to enhance the public's understanding, especially as regards safety in the field of radiation and nuclear power;

(k) International agencies should facilitate the establishment of national or regional capacity for the production and regular distribution of radioisotopes coming from both reactors and accelerators;

(l) The international and national agencies should use mechanisms that would enable them to make optimum use of the limited financial resources available, establishing priorities for dealing with the main regional problems of the developing countries and promoting greater efficiency in the utilization of those financial resources;

(m) The international, regional and national agencies should increase the resources they provide for the support of programmes for the maintenance of equipment used in non-power nuclear activities and quality-control programmes;

(n) Encouragement and support should be given to the existing capacity and potential in the region for the construction of basic measuring and control equipment, which would facilitate the horizontal dissemination of the nuclear activities with applications in biological sciences, medicine, food and agriculture that will have the greatest impact on the economic and social development of the region.

Annex

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