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NOTE ON THE ACTIVITIES OF THE INTERNATIONAL ATOMIC
ENERGY AGENCY IN THE FIELD OF NUCLEAR POWER

Submitted by the International Atomic Energy Agency

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/Introduction

Introduction

One of the main statutory responsibilities of the International Atomic Energy Agency lies in the field of the development of nuclear power for peaceful purposes.

Successive resolutions of the General Conference of the International Atomic Energy Agency^{1/} have reemphasized the importance attached to this subject by the Member States and stressed the need for special attention to the requirements of less developed countries.

The discharge of this responsibility involves three categories of activities :

1. The collection and dissemination of technical and cost information on power reactors;
2. The development of methods for the evaluation and use of this information;
3. Applications to specific case studies which may be requested by Member States.

1. Technical and cost information

As far as technical information is concerned the Agency follows of course very closely the development of different power reactor systems and the problems which may arise from their operation in less developed countries. Following the offer made by the United States Government at the last session of the General Conference for the Agency to participate in the design, construction and operation of small and medium power reactors in the United States^{2/}, the Agency has established close contact

^{1/} Assistance to Less Developed Countries, GC(II)/RES/27, 8 October 1958; Assistance to Less Developed Countries with the Production of Nuclear Power, GC(III)/RES/57, 8 October 1959; Studies on Nuclear Power Costing, GC(IV)/RES/86, 6 October 1960.

^{2/} See document GC(III)/COM.1/OR.22, paragraph 92.

with USAEC concerning this part of its programme. It is proposed to make full use of the offer by sending Agency staff members for short visits to follow up the development of this work, and the first such visit has already taken place. Besides gathering technical information it will be the role of the Agency to indicate to the reactor designers various problems which less-developed countries may face when building and utilizing such power plants.

With regard to cost information the Agency will from time to time prepare a survey of the latest data on power reactor costs and the first of these documents has already been issued.^{3/} The second and much more comprehensive report taking into account the important technical cost information presented at the small and medium sized reactor Conference will be prepared in the course of 1961 for submission to the 5th session of the General Conference.

2. Development of methods for cost evaluation

In trying to apply the cost data on power reactors published in the literature or disseminated by the Agency, Member States may encounter difficulties in :

- (a) interpreting the significance of construction and fuel cost figures quoted by nuclearly advanced countries;
- (b) extrapolating these figures to their own situation;
- (c) determining on their basis meaningful nuclear power costs.

In each of these fields the International Atomic Energy Agency intends to be of assistance to its Member States and has already initiated action which should lead to the development of a coherent system of nuclear power costing.

Thus the Secretariat is at present engaged in the preparation of a manual on nuclear power costing which has been reviewed by two panels of costing experts and should be published in 1961. This manual is designed

^{3/} The Development of Nuclear Power, Review of Nuclear Power Costs, GC(IV)123.

/to provide

to provide a checklist of items which the construction and operation of a nuclear power reactor would involve as well as to suggest some uniform procedure for the determination of the generating costs of the electrical energy produced by a nuclear power station.

The determination of generating costs for a single nuclear station is of course only a first step in the evaluation of the merits of nuclear power. If the nuclear station is operated within a power system, comparison between costs to the system arising from a nuclear and a conventional power plant will usually be required and if a country contemplates a comprehensive nuclear power programme, the indirect costs to the whole national economy should be taken into account and balanced against possible alternatives. These problems of system and countrywide costing are, however, so complex that they clearly deserve separate studies which will be undertaken at a later stage in full cooperation with the United Nations.

3. Applications to specific cases

While analysing and disseminating nuclear power costs data and developing general methods for their extrapolation and application the Agency stands of course ready to provide assistance and advice to its Member States in regard to any nuclear power project they may contemplate.

The Agency's role in this connection must necessarily be different with respect to areas or countries in differing stages of industrialization. In industrialized areas the Agency will endeavour to stimulate as complete an exchange of technical and economic information as possible. It is felt that such exchanges of views among advanced countries that have followed different lines of thought, will be a good method of detecting the "soft spots" on which attention should be concentrated in order to reduce the cost of nuclear power.

Referring also to industrialized areas such as those mentioned above, the Agency will always be prepared to provide help and advice in regard to any nuclear power project contemplated. Mention may be made here of the project to build a 150-200 MWe nuclear power station in the

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Rio de Janeiro-Sao Paulo areas (the Mambucaba Project), for which Brazil has already requested the Agency to provide experts on third party liability and nuclear safety. In the future the Agency may be called upon to play a more active role for projects of this nature, for instance in the preparation of an invitation for international tenders.

In the case of countries which have not yet reached any decision regarding the installation of their first nuclear power plant but which have already a large amount of experience in industrialization and conventional energy production and distribution, the Agency's assistance might be concerned with analysis of the conditions under which a first nuclear power plant could be profitably installed within an existing power network. Evaluations of this type require the power system in the area concerned to be already well developed, and extrapolation of its expansion during, for example, the next ten years to be based on long experience in the past.

The case of Finland provides a good example in point. On 3 December 1959 Finland invited the Agency to participate in joint studies with a view to determining the possible role of nuclear power in the country within the next decade.

The Finnish Atomic Energy Commission, in co-operation with the largest electricity supply undertaking, the state-owned Imatran Voima Cy, has set up a study group headed by the Chairman of the Commission. Following approval by the Board, the Director General designated a member of the Secretariat to serve as the Agency representative and as a special assistant to the head of the study group. An agreement between the Agency and the Commission providing for co-operation in carrying out these studies was signed on 3 March 1960 and the work was started later that month. The first phase of the studies consisted in a survey of the power resources of the country and the analysis of estimated future power demands. The bulk of this work, primarily concerning conventional power, was carried out by the Finnish study group, but the Agency co-operated by indicating and analysing data of particular importance in assessing
/the future

the future role of nuclear power. One of these important factors - in a country where the power system is predominantly hydro-electric and thermal power is used to support hydro-electric power in times of high demand or low water - is the evolution of thermal production from peak to base-load duty. Finland has already developed approximately one half of its economic hydro-electric potential and the transition of a part of the thermal capacity to base-load duty will become an important feature of the power system in the next decade. The possible role of nuclear power in providing for that part of the thermal base-load can only be assessed after an economic analysis of power generating costs in alternative types of prime movers. It is expected that this phase of the studies will be completed by the end of July 1960, and that the report dealing with this question will be available to the Agency shortly thereafter.

In lesser developed countries, in the commonly accepted sense of the term, such accurate forecasts of power programmes may not be possible. It must be stressed that any serious plans for introducing nuclear power into a system can only be based on the knowledge of the availability and cost of power from conventional sources as well as of the estimated future power needs. Consequently the investigation to be carried out by the Agency of the possible role of nuclear power in these countries will have to be based on such preliminary power studies.

One example of this type of situation is that of the Philippines which has requested the Agency's assistance, under the programme to implement resolutions GC(II)/RES/27 and GC(III)/RES/57, in initiating a study in the latter part of 1960 of the potential role of nuclear power in the Philippines over the next decade.

The study in its first stage would be mainly concerned with the economic and technical aspects of the possible installation of a nuclear power plant in the Marilla area of the Luzon integrated network during the next decade, particularly keeping in view the power demand in the area and, more generally the economic and industrial factors of the whole country. In addition, it might be possible to initiate a subsequent enquiry into
/the economic

