Experience with nuclear power – conference preview

The development of nuclear energy for peaceful purposes has had a series of big international scientific and technical conferences as major milestones. The first was, of course, the United Nations Geneva Conference in 1955, which released a wealth of information which had hitherto been classified. This conference gave rise to a worldwide enthusiam for the potential and possibilities of nuclear power. The three following Geneva Conferences in 1958, 1964, and 1971 showed a successive slow change in character reflecting the change in the nature of the information exchange which was taking place, the new role of smaller and more specialized meetings, and fast and extensive literature dissemination systems. Steadily, these conferences turned from the original role of international information exchange among scientists and technicians to one of summarizing a wealth of available information in order to present it to those who were to take planning and programming decisions in each nation, reflecting also the hopes and the great investments required in nuclear power. The IAEA, established in 1957, provided the UN with a scientific secretariat for the last two Geneva Conferences, and itself organized the Conference on Nuclear Power and its Fuel Cycle in Salzburg in 1977 at a time when the closing of the nuclear fuel cycle was a focal point of interest.

In many countries, nuclear power is now facing serious doubts, which in some cases have lead to a virtual suspension of nuclear power programmes pending parliamentary and special commission reviews of environmental, safety and economic issues. Still, the nuclear industry has now accumulated more than 2500 power-reactor-years of operational experience with an extraordinarily good safety record. This represents a great fund of experience to show the maturity of nuclear power and also a wealth of information from which definitive conclusions should be drawn both as regards the status and the achievements and the lessons to be learnt for the future.

Already now more than 8% of the world's electricity comes from 272 nuclear power plants. In some countries the nuclear share of electricity is more than 30%. There are now 238 plants under construction and in 1985 we know that more than 400 nuclear power plants will provide some 17% of the world's electrical energy. This rapid increase is independent of any decisions about additional plants which can be taken now.

The doubts facing nuclear power in many countries over the past decade have often not been technical in nature but related to public and political acceptance. Economic recession and conservation efforts have also tended to diminish the apparent urgency to take decisions on further extension of nuclear power programmes. Independent bodies, such as the World Energy Conference, have repeatedly pointed to the need for nuclear power to meet the world's future energy needs. The long lead-times before a plant can achieve production and the present reticence in many countries in taking long-term planning decisions may have very serious consequences for the future. It thus seems timely and necessary to assist nations in evaluating the technical, safety, and

The seven main topics of the conference

Planning and development of nuclear power programmes
Senior national officials will review the experience gained in the planning and development of nuclear power and fuel cycle programmes.

Technical and economic experience of nuclear power production
Both power plant suppliers and operators will review the main lines of development of nuclear power plants, and the experience gained in their design, construction, and operation, from the technical and economic points of view.

The nuclear fuel cycle
A review of technical and economic experience from uranium resource development and the whole front- and back-ends of the fuel cycle. A separate technical session will be devoted to fuel performance and in-core fuel management in the present generation of reactors.

Nuclear safety
As a follow-up to the Stockholm Conference in 1980 the main safety issues which have been and are orienting nuclear safety will be reviewed.

Advanced systems
Two sessions will review fast breeder and other advanced systems to show the experience base which exists with them for future applications on a large scale.

International safeguards
As an indispensable element for the international development of nuclear power the background, scope and implementation experience of IAEA safeguards will be reviewed with some emphasis on its impact and relationship with national systems and effectiveness.

International co-operation
On the international scene nuclear power development has been characterized by a specific agreement structure for bilateral co-operation, multinational projects, and international co-operation through organizations. These will be reviewed briefly.

economic aspects of nuclear power. The IAEA's Board of Governors, on the recommendation of the Scientific Advisory Committee, decided to call an international conference to discuss the available experience in nuclear power and to make an authoritative asessment of its achievements on the basis of experience accumulated in Member States. The Conference on Nuclear Power Experience is to be held at the Hofburg in Vienna from 13 to 17 September 1982.

To achieve the objective of the conference the papers, invited or contributed, should be focused on the following three questions:

- A critical and constructive review of industrial-scale realization, reliability, economics, and safety.
- Which were the main lessons to be learnt.
- What are the implications for the future?

In general it is planned that a subject will first be taken up in technical sessions, which will be summarized to plenary sessions in which invited papers will review major issues. A panel discussion will finally help to bring out the main points of some of the subjects.

The panel subjects have not yet been decided in detail, but among the main issues which are expected to be highlighted in the conference and discussed in the panels certainly are: prerequisites for initiating nuclear power programmes – lessons learned; regulatory experience related to the introduction of nuclear power; nuclear safety experience and future prospects; and capabilities and limitations of international safeguards. The first two subjects would refer to smaller nuclear power programmes in industrialized or developing countries with emphasis on the infrastructure requirements for a successful programme.

Special lectures

The conference will be introduced by two lectures immediately following the formal opening. The first, a critical review of past global developments, will be given by Mr M. Pecqueur, Head of the French Commissariat à l'Energie Atomique. In the second lecture Mr A. Petrosyants, Chairman of the Soviet State Committee on the Utilization of Atomic Energy will review the options and probable developments for the future.

An evening session will review "Energy, nuclear power and environmental health". A number of studies have recently tried to assess the environmental and health risks of different methods of producing electricity. It appears, however, that knowledge of the risks of other systems, e.g. coal-fired plants, is far less developed than for nuclear power. The health risks of carcinogens and poisonous substances released from the burning of fossil fuels are, for instance, much less well known than the radiation risks. The evening session will present a neutral summary of the present situation. It will be open not only to conference participants. There will be two invited lectures, the first one by Messrs Clarke and Webb of the UK National Radiological Protection Board, based on the report of the UN Scientific Committee on the Effects of Atomic Radiation, on the extent of our knowledge of radiation risks from the nuclear fuel cycle and nuclear power plants. The second lecture by Mr Hamilton, of the US Brookhaven National Laboratory and consultant to the UN Environment Programme will try to show how far valid comparisons can be made with other energy systems, where data are lacking, and how better data could influence future comparisons. A panel discussion will then respond to questions from the audience.

The conference has met with a very good preliminary response. More than twice the number of papers which can be accepted, have been contributed. An international expert group met from 15 to 18 February to advise on the selection of the papers to be presented and on the programme of the conference. 223 papers will be presented by outstanding authors in many cases of world renown, from 37 countries.

The conference should be an important contribution to the review of our experience with nuclear power in all its different aspects. In this way it should also help lay a technical foundation for the discussions at the United Nations Conference on the Promotion of International Co-operation in the Peaceful Uses of Atomic Energy which will be held in Geneva in August and September 1983.