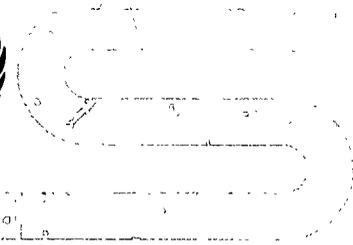


**INTERNATIONAL CONFERENCE
ON NUCLEAR POWER AND ITS FUEL CYCLE**

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INTERNATIONAL ATOMIC ENERGY AGENCY

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**INTERNATIONAL EXCHANGE OF
SAFETY AND LICENSING INFORMATION**

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U.S. nuclear energy activities were reorganized in 1975. The U.S. Atomic Energy Commission was abolished and two new agencies were created. The U.S. Nuclear Regulatory Commission (NRC) was given the responsibility for nuclear energy regulation. The U.S. Energy Research and Development Administration (ERDA) was given the responsibility for nuclear energy development and promotion. ERDA was also given the task of managing U.S. energy R&D programs in non-nuclear areas.

At present, the U.S. is considering further consolidation of its energy activities in a Department of Energy. This new Department would bring together nearly all of the energy policy and program functions of the U.S. government. The principal exception is nuclear energy regulation. This function will continue, as it is today, to be carried out by the NRC. NRC's form and responsibilities will remain essentially the same as they have been.

Thus, NRC will continue to plan and carry out the following activities involved in the licensing and regulation of the commercial nuclear industry:

1. Licensing of nuclear power reactors and fuel cycle facilities to assure safety and limit environmental impact.
2. Physical protection of nuclear facilities and nuclear material accountancy.
3. Licensing of exports and imports of nuclear materials and facilities.
4. Development of standards and written regulations to govern the safety and safeguards activities of licensees.
5. Research to understand safety phenomena and to ascertain the degree of conservatism in assumptions used in safety-design calculations.
6. Inspection and enforcement to assure licensee compliance with NRC regulations and licensing conditions.

NRC International Programs

Within the framework of these responsibilities and activities, NRC has been pleased to cooperate with the authorities and institutes of other countries concerned with nuclear safety and regulation matters. We also participate in the safety and safeguards work of the IAEA.

Several years before the reorganization, AEC-Regulation had begun to establish ties with the nuclear regulatory authorities of other countries, especially those in which light water reactors were operating. Hundreds of visitors from all over the world were visiting the U.S. yearly to share experience in management of reactor safety problems, and the U.S. nuclear safety and regulation staff were traveling overseas to establish contacts with their colleagues on matters of nuclear safety and environmental protection.

With the creation of NRC, the extent of this interaction with foreign governments and international organizations was substantially broadened. In addition to matters of nuclear safety and environmental protection, the interests of the new NRC organization expanded to include confirmatory safety research -- a function transferred from the AEC to NRC -- and export and import licensing.

Objectives

The international objectives of the NRC became threefold:

- (1) To improve the safety of the public by assuring the timely exchange of regulatory and safety research information with other countries;
- (2) to take account of U.S. security, safety, and environmental interests in the review of applications for licenses to export or import nuclear materials and facilities; and
- (3) to participate in international activities which support U.S. nonproliferation and safeguards goals.

The first of these objectives, related to the exchange of regulatory and safety research information, is the primary focus of this paper.

Today there are about 175 commercial power reactors in the world. Sixty-three of these are in the United States. In terms of rated capacity, the total of all 175 operating power reactors is about 92,000 megawatts electric. About half of this rated capacity is in the United States.

The United States has had twenty-five years of experience in the construction and operation of light water reactors (LWR's). In recent years, we have addressed a great number and variety of questions, both real and hypothetical, on the design, construction and operation of LWR's and other nuclear facilities and on the use of nuclear materials. Despite the work which has been done in the past, and the design and operating improvements which have taken place, we expect that the future will continue to bring new questions and restated issues related to the safety and environmental effects of nuclear activities.

Several of the more serious operating problems of reactors in recent years have occurred more-or-less simultaneously in reactors in the U.S. and in similar reactors overseas. In this light, it is extremely important that we share information on reactor operating experience on a timely basis. Such cooperation can help us to take the earliest possible action in response to new problems, to avoid them or to lessen their adverse effects.

In the U.S., NRC alone spends about \$125 million per year in confirmatory safety research to better understand safety phenomena and to verify and establish the degree of conservatism of the assumptions being used in design safety calculations. Similar amounts are being spent for safety research in other countries. Sharing the results of

such research is essential to avoid unnecessary duplication, because no single country can afford to fund all of the safety research it is desirable to accomplish.

Forms of Relationships

NRC international relationships are of several types: bilateral and multilateral; general "arrangements" for exchange of information and exact financial contracts for international contributions to specific research projects. Some, of course, grow out of our participation in programs of international nuclear energy organizations.

A listing of NRC arrangements and agreements, and the dates they were concluded, is given in Table I. Several additional arrangements and agreements are being negotiated.

Bilateral Information Exchange Arrangements

Bilateral "arrangements" form the foundation of our system for exchange of safety information. Prior to the creation of NRC, separate arrangements for exchange of information on safety and safety research were being negotiated and signed by AEC-Regulation and the Division of Safety Research, respectively. Since 1975, several of the newer agreements for exchange of information provide for exchange of both safety ("regulatory") and safety research information. We now have a total of fifteen bilateral information exchange arrangements with agencies of eleven different countries. These arrangements provide broad frameworks for two-way communication on nuclear safety activities.

Research Cooperation Agreements

Several NRC safety research projects have been made available for cooperative participation within the energy research program of the OECD International Energy Agency (IEA). These include the Loss of Fluid Test (LOFT), the Power Burst Facility (PBF), and the Heavy Section Steel Technology program (HSST). We have signed eight agreements with agencies of foreign countries to share the costs and results of one or more of these NRC projects. In each case, in return for substantial funding assistance or direct contributions in kind, the participating country gains rights to participate in and share fully the results of one of these key safety research programs. These projects are good examples of international cooperation to lessen the time and costs associated with large projects. NRC also contributes to, participates in, and shares the benefits of certain foreign research projects. For example, NRC is one of the partners of the international group which has conducted

reactor containment research in the Marviken Facility, in Sweden, and which has begun critical-flow tests at the same facility. We also participate in and share costs of the Halden Reactor Project and the United Kingdom AEA Systems Reliability Service.

International Organizations

The International Atomic Energy Agency continues to serve as the focal point of multinational cooperation in peaceful uses of atomic energy, with special benefits not offered elsewhere in terms of contacts between the industrialized and less-developed countries, and between East and West. IAEA, of course, also holds the vital international safeguards responsibility and, in a related vein, issues and updates international recommendations on physical protection of nuclear materials and facilities.

In the nuclear safety area, the IAEA provides to industrialized and less-developed countries alike a wealth of important recommendations and criteria, which serve as international standards in nuclear safety and environmental protection. Mr. Iansiti of the Agency Secretariat is scheduled at a later session of the conference to describe the major IAEA program which is developing codes of practice and safety guides for nuclear power plants. This program is based on the collated and harmonized national standards of several industrialized countries. The U.S. is devoting several man-years of effort per year of the consulting services of its government and industry experts, as are other participating governments. NRC has named some of its most experienced and capable people to serve as members and alternate members of each of the Technical Review Committees in the five areas of work: Governmental Organization; Siting; Operation; Quality Assurance, and Design. The result of this standards program will be a body of safety codes and guides, which should be of the highest value to governments that now or in the future will be initiating nuclear power programs.

This standards effort is expected to last at least another two years. In the future, consideration will need to be given to a possible expansion of the program to include the remainder of the nuclear power fuel cycle, as well as standards for advanced reactors. It is premature to undertake such work now, and the opinion of the authors is that only in special cases will the technology in these other areas be sufficiently established, or agreed upon, to permit productive international standards writing within the next several years.

Another important new program of IAEA, of importance to less-developed countries and strongly supported by the U.S., is the professional-level nuclear power training that is underway in the two-phase Nuclear Power Project training courses being taught in Germany (Karlsruhe), in France (Saclay), and in the U.S. (Argonne). NRC supports this training by providing lecturers on safety subjects that are within the expertise of the NRC staff.

Looking beyond these training courses, there are other manpower development and training needs in less-developed countries which should be addressed. From NRC's perspective, as a safety and regulatory organization with frequent contacts with countries planning or constructing their first nuclear power plants, it seems that some of the more pressing areas relate to quality assurance programs and techniques, inspector training, safety reviews and analyses, and operator training and certification. NRC will participate in IAEA training programs developed in response to these needs. We will also try to respond on a bilateral basis to requests for specific assistance in these areas to the extent we are able. Such assistance might be in the form of consultation or the opportunity for foreign nationals to observe NRC training activities or other operations.

Bilateral Cooperation with Less-Developed Countries

The IAEA performs a unique function in the transfer of nuclear safety technology and other assistance from the industrialized countries to the less-developed countries. NRC recognizes this as a vital role of the IAEA and has thus channeled much of its cooperative energy through the Agency.

However, we do encourage less-developed countries to work directly with NRC, where that might prove useful. Among the hundreds of visitors each year who have come to NRC for meetings and consultations on regulatory and safety questions, about fifteen per cent have been from the less-developed countries. We have found that the frequency and intensity of direct consultations relates to the level of activity of the nuclear power program of the particular country. Visitors from countries which are planning or beginning construction of their first LWR power reactors have many questions which they wish to ask us. We, in turn, are pleased to provide the benefit of our experience in responding to such questions and in providing other assistance within our means. In this regard, it should be noted that NRC's interests and obligations are centered on safety, regulatory and nonproliferation objectives. We are not in a position to propose or carry out promotional or other broad cooperation with other countries. That is the role of other agencies in the U.S. Within the safety area, though, NRC wishes to do all it can to cooperate with other countries.

If appropriate, we are open to the possibility of concluding bilateral information exchange agreements with countries constructing or operating LWR power plants, or having some other appreciable basis of common interest with NRC. We have signed or are in the process of negotiating such agreements with several less-developed countries.

These agreements typically cover the exchange of technical reports and other information related to regulation of the safety and environmental impact of designated nuclear energy facilities. One key obligation is for each party to make special efforts to give early advice to the other of important events, such as serious operating incidents and government-directed reactor shutdowns, that are of immediate interest to the other.

The agreements can also cover collaboration in the development of regulatory standards, and cooperation in safety research and development.

Each party appoints an Administrator who is the responsible person in his country for conduct of the exchange. The two Administrators agree about the detailed structure of the exchange. It is the responsibility of each Administrator to send to the other any regular, serialized documents and reports that are published, as well as *ad hoc* reports, decisions, and other documents that result from the activities of his agency. Each Administrator has the duty to ask for information needed from the other party and, in turn, to respond to requests for information under terms of the agreement.

These agreements provide an almost unique source of assistance and advice for a regulatory agency of a country just starting to construct or operate LWR's. The NRC, with 2,700 staff members working on nuclear safety matters, usually has completed analyses and reports which pertain directly to problems or questions which are encountered overseas. In almost every case, when a LWR safety problem arises, the NRC staff has the capacity to assess its significance within a matter of hours or days. The NRC is pleased to cooperate with other countries on such questions, and to exchange information in all areas of nuclear safety on a routine basis under our bilateral agreements.

Summary

In summary, the NRC has in place a comprehensive program for communicating with foreign agencies on regulatory matters, and for extensive cooperation in safety research. In hundreds of visits to NRC and in answers to an even greater number of letters annually, we have cooperated with all of the countries that are building and operating LWR's and have exchanged a wealth of information.

The logic and wisdom of international cooperation and exchange are unarguable. The diversity of talent and expertise spread among nuclear regulators throughout the world offers all of us an opportunity to strengthen our regulatory programs with new ideas and new approaches. We should take full advantage of this opportunity. In this spirit, NRC welcomes inquiries about our work and about long-term exchanges that will provide for continuing reciprocal advice on nuclear safety matters.

Table I

ARRANGEMENTS FOR EXCHANGE OF REGULATORY INFORMATION

1. Japan	May 30, 1974
2. France	June 29, 1974
3. Spain	October 29, 1974
4. Sweden	December 6, 1974
5. Switzerland	December 9, 1974
6. United Kingdom	March 13, 1975
7. Italy	May 9, 1975
8. Germany	October 1, 1975
9. Denmark	October 3, 1975
10. Korea	March 18, 1976
11. Brazil	May 20, 1976

ARRANGEMENTS FOR EXCHANGE OF SAFETY RESEARCH INFORMATION

1. Japan	Spring 1973
2. Germany	March 6, 1974
3. France	October 16, 1974
4. Sweden	November 21, 1974
5. IEA Multinational (Austria, Belgium, Canada, Germany, Italy, Japan, Netherlands, Norway, Spain, Sweden, Switzerland, UK, US)	May 20, 1976

PROGRAM COOPERATION AGREEMENTS

1. Marviken	February 20, 1975
2. Germany (LOFT)	June 20, 1975
3. UK Reliability Study	August 21, 1975
4. Halden Project (Fuel)	November 28, 1975
5. Japan (PBF)	February 23, 1976
6. Japan (LOFT)	March 9, 1976
7. (LOFT) Nordic (Denmark, Sweden, Norway, Finland)	September 15, 1976
8. Netherlands	December 9, 1976

