THE OEEC EUROPEAN NUCLEAR ENERGY AGENCY

(An Agreement for Co-operation between IAEA and ENEA came into effect in September 1960. This article on the activities of ENEA has been supplied at our request by the ENEA Secretariat.)

The European Nuclear Energy Agency (ENEA) was set up in December 1957 as part of the OEEC* to develop nuclear collaboration in Western Europe. The OEEC's Steering Committee for Nuclear Energy, set up some years previously and composed of government officials responsible for nuclear energy programs in the countries of the Organisation, became the new Agency's controlling body.

The aim of ENEA is to foster the development of the production and uses of nuclear energy for peaceful purposes. Its functions include: (a) the promotion of joint undertakings, (b) co-ordination of nuclear research and training, (c) elaboration of uniform nuclear legislation on health and safety, liability and insurance, and (d) studies of national nuclear programs and assessment of the role of nuclear energy in meeting Europe's future power requirements.

JOINT UNDERTAKINGS

In the present state of progress of nuclear power, it is virtually impossible for any single country to afford to develop fully a new reactor system, and even the largest ones cannot do more than work on a few of the most promising concepts. International collaboration in joint undertakings enables resources in effort, equipment and money to be pooled for the maximum benefit of the countries participating, and is the only way whereby a sufficiently wide range of research possibilities can be covered in a reasonable time.

This is why the promotion of joint undertakings is one of the most important functions of ENEA, and why one of the first committees of the Agency to be set up was its Top Level Group on Co-operation in the Reactor Field. This Committee, whose chairman is Professor Francis Perrin of France and vice-chairman Sir John Cockcroft of the United Kingdom, was responsible for defining the aims and methods of European co-operation in the field of experimental and prototype reactors.

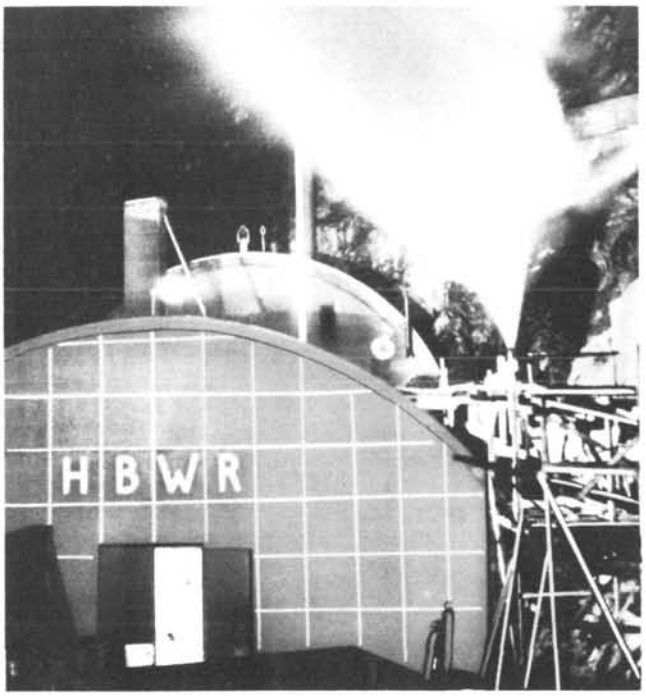
Halden Project

By an Agreement signed on 11 June 1958, twelve Member countries (six represented by the Euratom Commission) undertook a joint three-year project to exploit the boiling heavy water reactor built by the Norwegian Institutt for Atomenergi at Halden, south of Oslo. The reactor first went critical on 29 June 1959 and, following an initial program of low-power experiments, achieved boiling on 5 October 1960, thus becoming the world's first boiling heavy water reactor.

During 1961 the first fuel charge of natural uranium metal will be replaced by a second charge of 1.5 per cent enriched uranium oxide, with which powers up to 20 MWt are expected. To gain increased benefits from the experimental program, the participants have agreed to prolong the project for 18 months from 1 July 1961, increasing the budget to approximately $6 million.

Under an agreement concluded with the Norwegian Institutt, the Finnish Atomic Energy Commission is participating in the Halden Project, and the United States Atomic Energy Commission is associated through an information exchange and the sending of technical personnel.

The boiling heavy water reactor at Halden, Norway. Picture shows first steam being discharged through a stack on 5 October 1960



* *The OEEC (Organisation for European Economic Co-operation) was founded by an international Convention signed in April 1948 by Austria, Belgium, Denmark, France, the Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Sweden, Switzerland, Turkey, and the United Kingdom. Spain became a Member in 1959. The United States and Canada are Associate Members.*

Dragon Project

An agreement for a second joint reactor project, to investigate the possibilities of high-temperature gas-cooled reactors, was signed on 23 March 1959 by the same participants as in the Halden Project.

The five-year $38 million project is centered on the construction and operation, by an international team, of an experimental 20 MWt high-temperature gas-cooled reactor (Dragon) at the UK Atomic Energy Establishment at Winfrith.

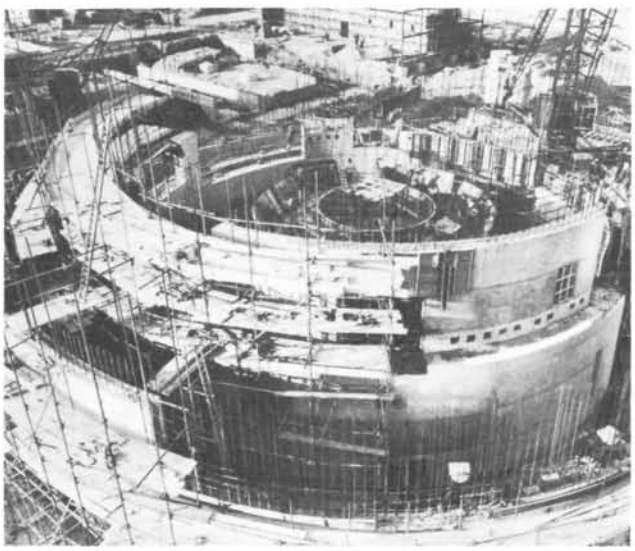
To ensure that maximum benefit is derived from the project by all the participants, a system of international competitive tendering has been instituted for the supply of the various elements required (including in some cases the design of plant and equipment). Arrangements have been made for associated research work to be carried out in national and industrial atomic centers and laboratories in the various participating countries: for example, at Risø in Denmark, Würenlingen in Switzerland, Studsvik in Sweden, Mol in Belgium, Petten in the Netherlands, and the UKAEA establishment at Harwell.

An agreement for co-operation and information exchange has been established with the United States Atomic Energy Commission's HTGC project at Peach Bottom, Pennsylvania.

Eurochemic

The European Company for the Chemical Processing of Irradiated Fuels (Eurochemic) differs from the Halden and Dragon experimental reactor projects both technically, since it is not a reactor project, and administratively, since it is not set up within the existing structure of a national atomic energy authority. The Company was created by a Convention signed on 20 December 1957, was constituted in 1959 and has a capital of $21.5 million. Its principal objective is to construct an experimental plant for the treatment of used uranium fuel from reactors in the participating countries.

Picture shows progress with the Dragon reactor building and (inside) construction of the reactor itself, one year after the start of work



Eurochemic is an international shareholding company in which governments, public or semi-public institutions as well as private groups are participating both in financing and running the business. Under its Convention it has its own international legal status and personality, and its international Board of Management is appointed by a General Assembly of the shareholders.

The Company's plant is now under construction at a site adjoining the Centre d'Etude Nucléaire at Mol in Belgium, where a number of research laboratories, as well as a "cold" testing station are already in operation. The detailed design of the plant has been prepared by the French company Saint-Gobain, and the construction is in the hands of a group of architect-engineers comprising companies with expert knowledge and experience from the countries participating in the project. This is in accordance with the declared objective of Eurochemic to ensure that the construction and operation of its plant shall provide, through the shareholders, the maximum possible experience and information for all the 13 participating Member countries of the OEEC.

Nuclear Ships

The use of nuclear power for ship propulsion is a subject in which a number of European countries are beginning to be concerned.

During the summer of 1960 an ENEA Information Mission, led by Dr. Sigvard Eklund, Chairman of the Agency's Study Group on Experimental Reactors, visited Member countries to investigate the development of national nuclear ship propulsion projects. The report of this Mission to the Agency's Steering Committee led to the setting up of a new Study Group whose terms of reference include a review of the economics of nuclear power and its potential advantages for merchant ships, an assessment of any special hazards which might be involved, examination of possible types of reactor system and ship which could be made the basis of a joint undertaking, and the means whereby such an undertaking could be organized on a European basis.

At the first meeting of the Study Group, which took place on 6 April 1961 under the chairmanship of Dr. Eklund, it was decided to embark immediately on two investigations: (a) to examine the economic potentialities of nuclear ship propulsion and the various reactor types at present under construction or envisaged, and (b) to examine the means whereby a European joint undertaking could be set up for the construction and operation of a nuclear ship.

SCIENTIFIC AND TECHNICAL CO-OPERATION

In addition to promoting joint undertakings, a function of ENEA is to encourage scientific and technical collaboration between national research organizations

and institutions in Member and Associate countries. Such collaboration is essential to achieve maximum efficiency in the use of national facilities, to avoid duplication of work and consequent waste of effort, and so to help each country to progress as rapidly as possible in acquiring nuclear knowledge. It can also, as for example in the case of environmental radioactivity measurements, facilitate uniform action to protect populations against possible nuclear hazards.

Nuclear Data

In 1959 ENEA, in collaboration with other interested authorities in Europe, the USA and Canada, set up a European-American Nuclear Data Committee to maintain under constant and critical review existing knowledge of important nuclear properties (notably cross sections), as well as the facilities available in OEEC Member and Associate countries for the determination of these properties.

The Committee is also charged with the collection and correlation of data from all available sources, and with the recommendation and promotion (where necessary) of technical meetings, symposia, and the pooling of information, equipment and personnel in order to further its objectives.

Possibilities of similar co-operation in other fields of basic research - such as reactor physics, direct conversion of nuclear energy to electricity, data processing, and waste disposal techniques - are at present being examined.

Food Irradiation

In January 1960 an ENEA Study Group was set up, comprising experts from 12 Member countries and from the USA and Canada, to examine food irradiation programs planned or under way in Europe and to investigate what practical action might be stimulated by the Agency in the further development of irradiation techniques.

As a first step the Study Group has arranged for a number of "feasibility studies" to be prepared on specific applications of irradiation. The first such study, covering inhibition of sprouting potatoes, has already been discussed by the Group; others will deal with salmonella prohibition in eggs, disinfestation of grain, and preservation of soft fruits and fruit juices.

There is close collaboration in this field between the ENEA Study Group and the United States Atomic Energy Commission.

Environmental Radioactivity

ENEA has made arrangements for the exchange and circulation among Member countries of information on environmental radioactivity as measured by national monitoring stations in each country. A European survey of these monitoring systems, including the methods and equipment used, has been made and published.

Periodical ENEA reports are prepared on airborne radioactivity measurements in the different countries and circulated to the competent national authorities, and a system has been established to provide these authorities with immediate emergency warning of any significant increase in radioactivity that may be observed.

TRAINING AND INFORMATION

The very rapid development of nuclear energy, and the novel technologies involved, call for special efforts in education and training and demand that the best possible use should be made of existing training facilities. To help ensure this ENEA carries out and publishes an annual survey of all nuclear energy courses available at universities, technical colleges and other institutions in Member countries.

In addition, the Agency arranges, in collaboration with nuclear study centers in Member countries (e.g. Harwell and Saclay) a variety of international courses for university teachers and business management, as well as international information conferences on many aspects of nuclear development. Of these last, the most recent was held in 1959 at Stresa, Italy, and was attended by some 500 top-level representatives from nuclear industry in Europe and North America.

In rather more specialized fields, ENEA organized a symposium on Health Physics in Nuclear Installations at Risø, Denmark, in 1959, and a similar symposium on Criticality Control in Chemical and Metallurgical Plant at Karlsruhe, Germany, in May 1961.

Economic Studies

One of the functions of ENEA is to follow the development of nuclear energy programs in Member countries, estimating the probable role of nuclear power in meeting Europe's future energy demands and the resulting economic prospects (production costs, markets for materials and equipment, and the needs for industrial facilities).

In this work the Agency collaborates with other OEEC bodies (e.g. the Organisation's Energy Advisory Commission which is concerned with over-all forecasts of Europe's future energy requirements from all available sources); with other international organizations (ENEA took part in the work of IAEA's recent Panel on Nuclear Power Costing); and with specialized organizations having nuclear economic problems (in collaboration with Eurochemic, a study has been made of the types and quantities of irradiated fuels likely to require reprocessing in Europe over the next few years).

ATOMIC LAW AND ADMINISTRATION

Health Protection

In June 1959 the OEEC Member countries agreed to base their national measures for health protection against ionizing radiations on norms elaborated by ENEA. These norms, which give maximum permissible radiation doses both for persons occupationally exposed to ionizing radiations and for the general

public, as well as maximum permissible concentrations of radioactive isotopes in air and drinking water, are themselves based on recommendations of the International Commission on Radiological Protection.

Third Party Liability

An OEEC international Convention on Third Party Liability in the field of nuclear energy was signed on 29 July 1960. The Convention, elaborated by an ENEA Expert Group, establishes a uniform European legal regime governing liability and compensation for damage to persons or property resulting from nuclear incidents.

Security Control

An ENEA Convention on security control, to prevent the use of jointly developed nuclear facilities for military purposes, came into force on 22 July 1959. The control is based on accountancy and inspection of nuclear materials, and operates under the direction of a Control Bureau set up by ENEA in February 1961. An independent international court, the European Nuclear Energy Tribunal, set up under the Convention to hear appeals arising out of the operation of the security control, has been formally constituted. The Tribunal also has certain competencies under the Eurochemic and the Third Party Liability Conventions.

RELATIONS WITH IAEA

In July 1960 the OEEC Council approved an agreement for co-operation between ENEA and the IAEA and this agreement was unanimously approved by the IAEA General Conference on 30 September.

The agreement provides for reciprocal representation of the two Agencies in committees and working parties, for liaison between the two Secretariats on projects or activities of common interest, and for a regular exchange of documents and information.

TOWARDS OECD

During 1960 discussions took place on the reorganization of the OEEC and its replacement by an Organization for Economic Co-operation and Development which will include Canada and the United States among its members. Certain decisions of principle were taken at a ministerial meeting on 23 July, and a preparatory committee was instructed to prepare a draft convention and to consider which of the OEEC Acts should be retained. The new convention was signed on 14 December.

It is not contemplated that this reorganization will affect the status or activities of ENEA.

NORA PROJECT OFFERS UNIQUE REACTOR RESEARCH AND ADVANCED TRAINING OPPORTUNITIES

As reported in the April issue of the Bulletin, an international program for reactor research and advanced training for a period of three years has been established in connection with the Norwegian critical assembly NORA.

Objectives

The aim of the project is to determine, through integral experiments, the basic reactor physics data for lattices moderated with light-water, heavy-water or mixtures of heavy and light water, with fuels of different sizes and spacings, three different enrichments and compositions. These objectives could be summarized as follows:

Contribution towards a better understanding of the fundamental physics of heterogeneous water moderated lattices.

Accumulation of data on systems which have not been investigated previously, notably systems moderated with mixtures of H_2O and D_2O (spectral shift system).

Improvement of experimental techniques.

Higher accuracy of existing data on selected systems.

Investigation of power reactor effects to the extent that these can be simulated in a critical facility.

The International Team

The joint project will aim at a high technical standard of work and it is hoped that this can be achieved by bringing together a carefully selected international team of research workers. The Norwegian Institute for Atomic Energy will provide the necessary permanent staff of the NORA facility; the international research team is being recruited by the Agency. The final selection of candidates will be made by the joint committee composed of the Indian scientist, R. Ramanna, as the chairman appointed jointly by IAEA and Norway and two scientific representatives each from Norway and from the Agency.

The candidates for the international team should have an academic degree and two to three years experience in the field of theoretical or experimental reactor physics, preferably related to the experimental program, and should be available for this work for at least one year. They should be able to speak and write fluently one of the working languages of the Institute, i.e. English or Norwegian. The positions to be filled during the first stage of the program are: