II

(Acts whose publication is not obligatory)

COUNCIL

COUNCIL DECISION

of 28 November 1991

adopting a research and education programme in the field of nuclear fission safety (1990 to 1994)

(91/626/Euratom)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Atomic Energy Community, and in particular Article 7 thereof,

Having regard to the amended proposal from the Commission (1), submitted after consulting the Scientific and Technical Committee,

Having regard to the opinion of the European Parliament (2),

Having regard to the opinion of the Economic and Social Committee (3),

Whereas, by Decision 90/221/Euratom, EEC (4), the Council adopted a third framework programme for Community activities in the field of research and technological development (1990 to 1994) specifying, *inter alia*, the research activities to be pursued in the area of nuclear fission safety and radiation protection ; whereas this Decision should be taken, in so far as appropriate, in the light of the grounds set out in the preamble to that Decision ;

Whereas, for activities falling under the EAEC Treaty, Article 2 of Decision 90/221/Euratom, EEC, provides for the implementation of the third framework programme through specific programmes adopted in accordance with Article 7 of that Treaty ;

Whereas the Joint Research Centre is to contribute through its own programme to the implementation of the aforesaid activities ;

Whereas basic research in the field of nuclear fission safety and radiation protection must be encouraged throughout the Community ;

Whereas, in addition to the specific programme concerning human resources and mobility, it is necessary to encourage the training of research workers and engineers in the context of the programme forming the subject of this Decision ;

Whereas in the context of the latter programme it is desirable that an assessment be made of the economic and social impact as well as of any technological risks ;

Whereas, pursuant to Article 4 of and Annex I to Decision 90/221/Euratom, EEC, the funds estimated as necessary for the whole framework programme include an amount of ECU 57 million for the centralized dissemination and exploitation of results, to be divided up in proportion to the amount envisaged for each programme ;

Whereas that Decision provides that a particular aim of Community research must be to strengthen the scientific and technological basis of European industry and to encourage it to become more competitive at the international level, while keeping safety standards as high as possible ; whereas that Decision also provides that Community action is justified where research contributes, *inter alia*, to the strengthening of the economic and social cohesion of the Community and to the promotion of its overall harmonious development, while being consistent with the pursuit of scientific and technical

(1) OJ No C 262, 8. 10. 1991, p. 5.
(2) OJ No C 240, 16. 9. 1991, p. 272.
(3) OJ No C 69, 18. 3. 1991, p. 33.
(4) OJ No L 117, 8. 5. 1990, p. 28.

excellence ; whereas this programme should contribute to the achievement of these objectives ;

Whereas the developing of cooperation on research and technological development with third countries, especially European countries, and international organizations may prove particularly fruitful for the carrying-out of this programme ;

Whereas it is desirable, as provided in Annex II to Decision 90/221/Euratom, EEC, to foster a harmonized approach to nuclear fission safety in the Community by bringing together all the parties involved, thus reinforcing the pre-normative dimension of research, particularly in radiation protection and reactor safety,

HAS ADOPTED THIS DECISION :

Article 1

A research and education programme in the field of nuclear fission safety, hereinafter referred to as the 'programme', as defined in Annex I, is hereby adopted for a period running from 28 November 1991 to 31 December 1994.

Article 2

1. The funds estimated as necessary for the execution of the programme amount to ECU 35,64 million, including expenditure on staff and administration amounting to ECU 6,94 million.

2. An indicative allocation of funds is set out in Annex II.

3. Should the Council take a decision pursuant to Article 1 (4) of Decision 90/221/Euratom, EEC, this Decision shall be adapted accordingly.

Article 3

Detailed rules for the implementation of the programme and the amount of the Community's financial contribution are set out in Annex III.

Article 4

1. In the course of the second year of implementation of the programme, the Commission shall review it and send a report on the results of its review to the European Parliament, the Council and the Economic and Social Committee ; this report shall be accompanied, where necessary, by proposals for amendment.

2. At the end of the programme, an evaluation of the results achieved shall be conducted for the Commission by a group of independent experts. This group's report, together with any comments by the Commission, shall be submitted to the European Parliament, the Council and the Economic and Social Committee.

3. The reports referred to in paragraphs 1 and 2 shall be established having regard to the objectives set out in Annex I to this Decision and in accordance with Article 2 (4) of Decision 90/221/Euratom, EEC.

Article 5

In the implementation of the programme, the Commission shall be assisted by the appropriate Advisory Management and Coordination Committees. Articles 2 to 6 of Council Decision 84/338/Euratom, EEC [1] shall apply to those Committees.

Article 6

1. The Commission shall be authorized to negotiate, in accordance with Article 101, second paragraph, of the Treaty, international agreements with third countries members of COST, in particular with member countries of EFTA, and the countries of central and eastern Europe, with a view to associating them with all or part of the programme.

2. Bodies and enterprises established in European third States may, on the basis of the criterion of mutual benefit, be allowed to become partners in a project undertaken within the programme.

No contracting body based in the countries referred to in the first subparagraph and participating as a partner in a project undertaken under the programme may benefit from Community financing for this programme. Such a body shall contribute to the general administrative costs.

Article 7

This Decision is addressed to the Member States.

Done at Brussels, 28 November 1991.

For the Council

The President

J. PRONK

[1] OJ No L 177, 4. 7. 1984, p. 25.

ANNEX I

OBJECTIVES AND SCIENTIFIC AND TECHNICAL CONTENT

This specific programme fully reflects the approach embodied in the third framework programme in terms of the scientific and technical goals and the underlying aims which it pursues.

Paragraph 5 (B) of Annex II to the third framework programme forms an integral part of this programme. It states that the general aim of Community action is to contribute to the safe use of nuclear energy. Under the respective responsibilities of the Community and the Member States, such action is therefore to come within the context of the whole problem area of safety, taking into consideration all aspects of nuclear power plants and the fuel cycle, including problems of waste management, radioactive and fissile materials, particularly plutonium, their transport and storage, decommissioning of nuclear installations and risks of accidents releasing radioactivity, several aspects of which are covered by programmes already adopted and other related activities.

The content of this programme, taking account of the above elements, is described as follows :

AREA 1 : RADIATION PROTECTION

The aim is to provide the scientific knowledge for an objective assessment of radiation effects and risks and to determine methods to optimize radiation protection. Research will be carried out to define the extent of exposure and the ways in which it can occur from natural, medical and industrial sources, study the health consequences, including the treatment of over-exposure, and assess, in a comparative and quantitative way, the risks which radiation can pose to man and his environment.

This scientific knowledge is a prerequisite for the continued updating of the 'Basic Safety Standards for the Health Protection of the General Public and Workers against the Dangers of Ionizing Radiation' and will provide the scientific basis for the continued evolution of radiation protection concepts and practices.

It is also aimed at maintaining and enhancing the technical and regulatory aspects of expertise in radiation protection and will help the relevant authorities to evaluate the impact of long-term choices in energy policy on man and his environment, to manage normal operational and emergency situations and to inform the public objectively about the risks and benefits of radiation. Health risks posed by decommissioning will be analysed both for systems of containing radioactivity in the event of serious accidents and for installations decommissioned or about to be decommissioned at the end of their normal operation.

Issues related to concern about radiation and its effects, heightened by the accident at Chernobyl and by more recent information on risk estimates and on the extent of exposure from natural, medical and industrial sources, will be addressed. Research will aim, in an increasingly complex environment, at reducing the uncertainties surrounding the evaluation of risks at low doses/low dose rates by combining epidemiological information with that obtained from a variety of experimental approaches.

The risks related to radon in homes will be assessed. Comparative studies taking into account the relevant factors (geographical areas, building materials, lifestyles, etc.) will be undertaken. They should provide information enabling effective and durable countermeasures to be devised to reduce population exposure. Research on optimizing procedures will be carried out in order to reduce patient exposure from diagnostic radiology. Management procedures based on improved scientific information will be developed to optimize radiological protection in the workplace.

Scientific procedures will be developed to allow the consequences of nuclear emergencies to be assessed in real time and their management to be improved thus enabling the most effective countermeasures to be taken, to reduce transfer of radioactive contamination to man and to treat victims of radiation accidents.

The solving of the complex problems involved requires that information from very different subject areas be integrated in a multi-disciplinary approach in which the following themes will be addressed :

Human exposure to radiation and radioactivity

The objective is to develop ways and means of measuring radiation doses in an accurate and reliable way and to define the critical pathways of radioactivity in the environment and possible strategies to impede the transfer of radionuclides to man.

The behaviour of radionuclides in the environment will be studied, focusing on natural and long-lived artificial radionuclides which can accumulate in natural or semi-natural ecosystems or undergo chemical and biological modifications. In addition, countermeasures to reduce the consequences of radioactive contamination for man and his environment will be investigated.

Effects of radiation exposure on man : assessment, prevention and treatment

The objective is to determine quantitatively effects occurring at low doses/low dose rates (stochastic effects), to develop means to recognize and treat consequences of radiation accidents (non-stochastic effects) and to assess effects on the developing organism.

A concerted approach based on microdosimetry, biophysical modelling, molecular, cellular and animal studies and epidemiology will be undertaken to understand the mechanisms involved and to evaluate the risks of radiation-induced cancer and genetic damage in man, making use, *inter alia*, of sampling and comparative epidemiological studies conducted in different areas.

This will lend considerable support to the interpretation of human epidemiological data and to their extrapolation to low doses/low dose rates.

Diagnosis and treatment of consequences of accidents involving local external or whole-body exposure or internal contamination with radionuclides, will be improved by studying their pathogenesis and making use of new molecular and cellular techniques. Investigations on the developing organism will focus on brain damage after irradiation in utero, on radiation-induced cancers and on the transfer of radionuclides in the foetus and during infancy and childhood.

Risks and management or radiation exposure

The objective is to evaluate the overall risks of human exposure to radiation and to provide the methods for optimizing and managing radiation protection in normal and accident situations.

Systematic information on human exposure from natural, medical and industrial sources will be collected and emphasis will be placed on epidemiological studies, including those on persons exposed at the workplace or to enhanced natural radioactivity. The factors affecting population radon exposure in homes and possible countermeasures will be investigated. Radiation risks will be put into perspective by comparing them with other risks.

Optimization of radiation protection in normal and accident situations will be investigated to conform with new basic standards. Radiation accident consequence models and emergency management procedures will be further developed. Optimization of diagnostic exposure will be achieved by developing quality assurance measures for medical image quality and analysing the risks and benefits of the different procedures.

AREA 2 : REACTOR SAFETY

The objective of this new activity is to contribute to the definition of what will be needed to satisfy the safety requirements for future generations of nuclear power plants and to improve confidence in safety analyses, through an exercise promoting consultation between parties concerned from all Member States of the Community, including those without a nuclear power programme.

The work envisaged will contribute to the assessment of the safety margins associated with design and operation of installations and to building confidence in the completeness of safety analyses and the realiability of the components involved in accident prevention. It will provide a reference point for initiatives in the Community and lay the basis for possible future Community action.

Selected key safety issues related to future nuclear power plants will be addressed, paying particular attention to technology making greater use of passive systems. Work will focus also on the safe containment of radioactivity under severe accident conditions and will mainly consider light-water reactors, which are the most widespread in the Community, other European countries and the rest of the world. Moreover, there will be some participation, from the point of view of design safety, in new generation reactors, planned for the future or in the development stage which are likely to be constructed between now and the end of the century.

The action at Community level will include studies, inter-comparisons of calculation methods and tools, such as probability safety analyses, and joint evaluations of research and development work, including validation of codes by experimental results. The three main themes addressed in this part of the programme will help to improve methods of evaluating accidents and to optimize intervention methods. After considering the potential challenges to confinement in the event of severe accidents and their implications for containment performance, the key issues will be addressed under the following three main themes :

Accident progression analysis

Severe accident phenomenology and its implications for containment will be studied with respect to in-vessel phenomena related to containment loading and to ex-vessel phenomena. The latter will deal, in particular, with hydrogen-related phenomena and their modelling, detection and control; fission product behaviour; coolability of corium, steam explosion and corium-concrete interaction.

Behaviour and qualification of the containment system

Research will deal with the integrity of the containment system (venting, seismic and other external events, degradation of leak-tightness due to ageing), modelling and failure mode analyses (material and structure behaviour, especially pre-stressed concrete), and the qualification and safety margins of containment structures, equipment and electronic systems with regard to severe accidents.

Accident management and control

Research will concentrate on the man-machine interface (computer-based aids for operators handling complex procedures and novel situations : e.g., recognition of abnormalities and their diagnosis and handling of incomplete or misleading information) and on strategies for intervention and accident mitigation.

ANNEX II

INDICATIVE ALLOCATION OF FUNDS ESTIMATED AS NECESSARY

(millions of ecus)

Area	Allocation
1. Radiation protection	28,64
2. Reactor safety	7,00
	Total 35,64 (1) (2) (3)

(1) Including staff costs amounting to ECU 5 million and administrative costs amounting to ECU 2 million.

An additional ECU 162 million will be earmarked for JRC research activities in the field of fission safety, including ECU 1,6 million representing the JRC's contribution to centralized dissemination.

(2) An amount, estimated as necessary, of ECU 0,36 million, not included in the ECU 35,64 million, will be set aside as a contribution from the fission safety programme to centralized action for disseminating and exploiting the results.

(3) An amount of ECU 5,6 million, being not less than 15 % of the total, is to finance projects promoting basic research which are duly identified as such.

An amount of ECU 0,75 million, representing 2 % of the total, is to finance projects promoting the training of research workers in the fields covered by this specific programme.

The breakdown between the two areas does not exclude the possibility that projects could cover more than one area.

ANNEX III

RULES FOR IMPLEMENTING THE PROGRAMME AND ACTIVITIES FOR DISSEMINATING AND EXPLOITING ITS RESULTS

1. The Commission will implement the programme on the basis of the objectives and the scientific and technical content described in Annex I.

2. The rules for implementing the programme, referred to in Article 3 of this Decision, comprise research and technological development projects, accompanying measures and concerted actions. Selection of projects must take account of the criteria listed in Annex III to Decision 90/221/Euratom, EEC and of the objectives set out in Annex I to this Decision.

   Area 1 (Radiation protection) will be conducted mainly through shared-cost research projects. For Area 2 (Reactor safety), activities will be carried out by means of concerted action, covered by contracts as appropriate.

   A. Research projects

   The projects will be the subject of shared-cost research and technological development contracts and Community financial participation will not normally be more than 50 %. Universities and other research centres participating in shared-cost projects will have the option of requesting, for each project, either 50 % funding of total expenditure or 100 % funding of additional marginal costs.

   Shared-cost research projects must be carried out by participants established within the Community. The projects, which may involve, for example, universities, research organizations and industrial firms, including small and medium-sized enterprises, must provide for participation by at least two mutually independent partners established in different Member States. Contracts relating to shared-cost research projects must as a general rule be concluded following a selection procedure based on calls for proposals published in the *Official Journal of the European Communities.*

   B. Accompanying measures

   Accompanying measures will consist of:

   — the organization of seminars, workshops and scientific conferences,
   — internal coordination through the creation of integrating groups,
   — advanced-technology training programmes, with emphasis being placed on multidisciplinarity,
   — promotion of the exploitation of results,
   — independent scientific and strategic evaluation of the operation of the projects and the programme.

   C. Concerted actions

   Concerted actions consist of action by the Community to coordinate the individual research activities carried out in the Member States. They may benefit from funding of up to 100 % of coordinating expenditure.

3. The knowledge acquired in the course of the projects will be disseminated both within the programme and by means of a centralized action, pursuant to the Decision referred to in Article 4, third paragraph, of Decision 90/221/Euratom, EEC.