ECONOMIC AND SOCIAL COMMITTEE
OF THE EUROPEAN COMMUNITIES

COMMUNITY NUCLEAR SAFETY CODE

STUDY

Brussels 1977

The European Communities' Economic and Social Committee, chaired by Mr Basil de FERRANTI, approved this study at its 148th plenary session, which was held on 27 and 28 April 1977.

The preliminary work was done by the Section for Energy and Nuclear Questions and the Rapporteur was Mr René BONETY.

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I N D E X

Introduction

On 22 July 1975, the Council of the European Communities adopted a resolution on the technological problems of nuclear safety (1).

In order to help formulate Community policy in this field, the Economic and Social Committee decided to produce the present Study.

On 24 February 1976, the Committee's Bureau instructed the Section for Energy and Nuclear Questions to draw up the Study. The Section approved the Study on 24 March 1977 and the Committee adopted it at its 148th Plenary Session on 28 April 1977. Voting was unanimous less one abstention.

(1) OJ No. C 185 of 14 August 1975, page 1.

Part 1 : Analysis of the Background to Nuclear Safety and Current Problems in this Area

1.1. Need for an Overall Community Approach

1.1.1. Safety is a vital factor in the industrial development of nuclear power applications. The rapid large-scale development in the nuclear field in several Member States must be coupled with measures to guarantee and maintain the safety of (a) workers in the nuclear industry (b) the public at large. Safety must be a top priority, irrespective of economic, industrial and political considerations.

1.1.2. Safety precautions must be stepped up to cope with new problems created by the advance in know-how and technology whose experimental reliability must help to minimize residual hazards. This is true for conventional reactors and, especially so for new types.

1.1.3. The Commission has undeniably used its Euratom Treaty powers in a bid to coordinate and unify Member States' action in this field. However, the growing relative importance of nuclear energy calls for Community alignment through the vehicle of codified mandatory minimum rules (2) which are binding on each Member State. The aim of such rules would be effective coordination of the safety measures taken by Member States in the various stages of the nuclear cycle. The implementation of a Community Code necessitates a substantial extension of the Commission's powers to deal with these specific nuclear safety problems and therefore requires a top-level political decision. This is a fundamental matter, and the Commission will have to submit concrete proposals to the Council of Ministers. These proposals would have to be drafted in the light of discussions with Member States' governments, industrialists active in the nuclear sector and representatives of the relevant trade unions.

1.1.4. Some facts which warrant a Community Nuclear Safety Code are recapitulated below. In some cases, the strictly nuclear safety aspects involved are already covered by (a) the rules of the International Commission on Radiological Protection and (b) the Euratom Treaty.

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(2) Definition of uniform standards to be adhered to by all EEC countries.

a) The search for a common energy policy;

b) If accidents occur at nuclear plants, the consequences may well extend beyond national frontiers; this risk is particularly serious in the case of reactors located in frontier regions;

c) The problems attaching to (i) the free movement of labour in the Community; (ii) the protection of workers; and (iii) the need to abolish inequalities in this field and with regard to the protection of the general public;

d) The international character of (i) the transport of radioactive material and, in particular, irradiated fuel; (ii) the processing of irradiated fuel; and (iii) the storage of radioactive waste;

e) Technical solutions have still to be found for certain problems (siting criteria, thermal pollution, radioactive waste disposal, etc.). The implications of these problems for mankind transcend national frontiers and entail a heavy responsibility towards future generations;

f) Production costs may vary, in the absence of an adequate degree of alignment at Community level;

g) The existence of technical barriers to nuclear plant supplies within the Community;

h) The need to ensure that fissile materials are employed solely for the purpose declared by their users. Under the Euratom Treaty the Commission is directly responsible for implementing this rule. Agreements on this matter should be negotiated at international level.

1.2. Analysis of the Background to Nuclear Safety

1.2.1. Nuclear safety is an extremely broad field. Quite apart from the technological options and the precautionary measures which have to be decided upon at the design stage, safety depends upon a large number of factors. The risks inherent in the production of nuclear energy therefore have to be calculated, not only on the basis of the potential dangers of nuclear plants, but also in the light of the considerable complexity of reactors and the fuel cycle, from the mine right through to the storage of wastes. The technological options themselves are linked to scientific and technical research, though a satisfactory solution can be found only in close liaison with industrial practice. Both of these factors are part of a genuine safety policy. There is no reason to be complacent simply because everything has gone well

so far and there have been few accidents in the nuclear power industry. It must be remembered that hitherto the development of this industry has been slow and cautious. The problem to be faced today is how to ensure nuclear safety at a time when faster progress is being made towards large-scale production. Research will be necessary to solve the difficulties which still exist.

1.2.2. Since the establishment of the European Atomic Energy Community, Council action in the field of radiological protection and nuclear safety has concentrated on :

- The drawing up and promulgation in 1959 of directives laying down basic standards for the protection of workers and the general public against the dangers arising from ionizing radiations (Articles 2(b), 30, 31 and 218 of the Euratom Treaty);

- The amendment of these radiological protection standards in the light of progress in scientific knowledge (in 1962, 1966 and 1976) under Article 32 of the Euratom Treaty;

- Supervision of the extent to which the principles of radiological protection and the values laid down in the basic standards are implemented in the laws, regulations and administrative provisions of the Member States (Article 2b) and Article 33 of the Euratom Treaty);

- Community level consultation on all radioactive waste projects proposed by the Member States which, if implemented, would be liable to expose another Member State to radioactive contamination (Article 37 of the Euratom Treaty);

- Steps to harmonize individual dose monitoring (intercomparison programmes, technical recommendations);

- Measures to provide information and training in the field of radiological protection;

- Execution of "direct" nuclear safety research projects in the Joint Research Centre. The fields covered include reactor safety, research into actinides and plutonium fuels, management of nuclear material and radioactive wastes;

- Execution of "indirect" research projects in the fields of biology and health protection, radioactive waste management and storage, and plutonium recycling in light-water reactors;

- Approval of a resolution on the technological problems of nuclear safety.

1.2.3. The basic standards on the protection of workers and the general public against ionizing radiation are undoubtedly the most important achievement of the EAEC. These standards were adopted in 1959 (3), and amended in 1962 (4), in 1966 (5) and again on 1 June 1976 (6). The appendices to this Study include a summary of planned and current research projects, and the Council Resolution of 22 July 1975 on the Technological Problems of Nuclear Safety.

1.2.4. Nuclear safety requirements differ, as do the methods employed to fulfil them. There are also differences as regards licensing procedures for the siting, construction and operation of nuclear plants. As long as these differences do not jeopardize safety, they are acceptable in the current "de facto" situation.

1.2.5. Amongst the differences which may make it difficult to align safety regulations, mention may be made of the following :

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(3) OJ No. 11 of 20 February 1959
(4) OJ No. 57 of 9 July 1962
(5) OJ No. 206 of 26 November 1966
(6) OJ No. L 187 of 12 July 1976.

a) Differences in the types of reactors chosen : for example, only three Member States have fast breeder reactors, and only five have reprocessing plants; as far as the reprocessing of irradiated oxide fuels is concerned, these plants - including those of commercial scale - are still in the prototype stage.

b) Differences in technological features which have a bearing on plant safety : e.g. different types of shielding for light-water reactors of the same rating and for storage ponds for irradiated fuel; emergency cooling systems of different designs and capacities; different forms of protection against natural catastrophes, sabotage, missile or aircraft attack and core meltdown;

c) No Member State makes explicit allowance for the rupture of a LWR vessel in safety calculations, for such ruptures are considered to be extremely improbable. Opinions differ on the need to cater for such a rupture, especially in densely populated areas;

d) Differences in engineering solutions for emergency cooling systems;

e) Differences in certain Member States in (a) procedures for gaining access to safety reports and in (b) the contents of these reports;

f) Differences in the ways and means in which ordinary citizens can play a part in the licensing procedures for nuclear plants.

1.2.6. There are further cases where shortcomings and needs are apparent :

a) The continuous reprocessing of spent LWR fuel still involves certain technical difficulties. World reprocessing capacity is inadequate. This means that fuels from nuclear power stations which are not reprocessed must be stored in ponds. This state of affairs - which can only be tolerated on a temporary basis - will create further storage and therefore safety problems. For all these reasons, including the safety aspect, adequate reprocessing capacities must be established.

b) Highly radioactive liquid waste, which is stored in tanks at the moment, will have to be solidified in a suitable way. Processes are being developed and tested.

c) It would appear necessary to improve safety concepts and techniques in areas where new developments are taking shape, particularly with respect to reprocessing plants, retention systems for radioactive gases (krypton 85, iodine) and liquids (tritium, other radionuclides) which are released to the environment, emergency cooling systems for vessels containing fission products and protection against aircraft and missiles.

d) Fast breeder reactors pose specific safety problems due to the use of sodium as coolant and plutonium as a fuel in compact form. These features create problems at the transport and spent-fuel reprocessing levels. The examination of these problems and their solutions at Community level will have to go hand-in-hand with the development of fast breeder reactors.

e) Although plutonium is being produced and handled in only small quantities at the moment, the drawing up of Community safety rules on the industrial use of plutonium must be coupled with the launching of a programme for either plutonium recycling in light-water reactors or the use of plutonium as a fuel in fast breeder reactors;

f) As yet, not enough experience has been gained with regard to solutions for the long-term storage of radioactive waste. Although certain processes seem to be suitable for the reprocessing and definitive disposal of such waste, the technical criteria are inadequately proven. Storage in liquid form in reprocessing plants is only a stop-gap measure. Some headway has been made in France and Germany with processes for vitrification of high-level waste. Nevertheless, vitrification is only in its infancy;

g) In assessing the risks involved in the transport of radioactive material, and irradiated fuel in particular, insufficient allowance has been made for the very rapid increase in the scale and diversity of such risks and their increasingly international character. It is necessary to determine which of the various modes of transport are safest. In addition, a study should be made of the case for the creation of "nuclear parks" for the precise purpose of limiting shipments of certain radioactive materials.

1.2.7. Although the military use of nuclear energy is not a central theme of this Study, the Committee cannot ignore the resultant risks to which the public is exposed. Consequently, the Committee thinks that the safety rules embodied in the Code should apply just as strictly to nuclear installations that are used for military purposes. Similarly, when nuclear installations to be used for peaceful purposes are exported, the Community must ensure that these safety rules are also written into the contracts.

Part 2 : A Community Nuclear Safety Code

2.1. Factors to be considered when a Community Code is being drawn up

2.1.1. Several Committee Opinions should be taken into account when a nuclear safety code is drawn up. These are :

- the Opinion of 29 May 1975 on the Communication from the Commission to the Council entitled "Programme on Radioactive Waste Management and Storage" (7);

- the Opinion of 29 May 1975 on the Communication from the Commission to the Council on the Technological Problems of Nuclear Safety (8);

(7) OJ No. C 263 of 17 November 1975, page 46
(8) OJ No. C 263 of 17 November 1975, page 52

- the additional Opinion of 29 October 1975 on the Communication and Proposals from the Commission to the Council entitled "Towards a New Energy Policy Strategy for the Community" (9).

Various Commission departments have carried out work on nuclear safety, and as a result the Community has a sound base for progress on, inter alia, basic safety standards for protection against ionizing radiation, research programmes and coordination between the Member States on the technological aspects of nuclear safety. This work has been in progress for several years, and seeks to bring about a gradual alignment of national nuclear safety rules. In addition, the systematic move to align the technological aspects of safety which has been in progress for four years, must be continued.

The Committee considers that the Code would be a logical sequel to the above measures, since it would provide an overall framework within which they could be expanded.

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(9) OJ No. C 15 of 22 January 1976, page 21.

2.1.2. The following steps should be taken with a view to achieving this alignment :

a) A comparison should be made of (i) nuclear plant construction programmes in the various Member States and (ii) national and Community research and experimental programmes in the field of safety and protection. The Commission has already published a report on the matter and is continuing its attempts to bring about concerted, coordinated action (10);

b) A comparative survey should be made of the differences between Member States as regards safety technologies, criteria and standards, measures for protecting workers and the general public and the basic features of procedures and legislation concerning the building of nuclear plants. The Commission has also carried out work in this field and this is reflected, inter alia, in the publication of a number of reports (11) (12);

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(10) Doc. EUR 5394e (1975) "European Community Light-Water Reactor Safety Research Projects - Experimental Issue".

(11) Doc. EUR 5284e (1974) "Authorization Procedure for the Construction and Operation of Nuclear Installations within the Member States".

(12) Doc. EUR 5362e (1975) "Catalogue and Classification of Technical Safety Rules for Light-Water Reactors and Reprocessing Plants".

c) Stock should be taken of the extent to which the "basic standards (established pursuant to Articles 30 ff. of the Euratom Treaty) for the protection of the health of workers and the general public against the dangers arising from ionizing radiations" have been enforced. While recognizing the efforts which the Community has made in the field of radioprotection since 1958, the Committee urges the Council and the Commission to further intensify these efforts;

d) A critical study should be made of the way in which the Member States are applying safety rules, and the changes needed in these rules in view of the transition from prototype to commercial plants;

e) Steps should be taken to ensure that, as requested in the Committee's Opinion of 29 May 1975 on the Technological Problems of Nuclear Safety, the Commission does not solely formulate "recommendations of a general nature .....", but also creates the conditions necessary for the issuing of directives and regulations in this field, in order that it may thereby lay down minimum standards for all nuclear plants in the Community";

f) A study should be made of the extent to which proposed programmes are consistent with safety requirements at all levels (in the light of the current situation and expected future trends);

g) The levels of physical protection in the various Member States should be compared and standardized.

2.2. Fundamental Principles of the Code

2.2.1. The Code must clearly identify the procedures by which the Community, the Member States, their national or regional institutions and the relevant representative bodies are to be involved in drafting, implementing and improving safety rules.

2.2.2. In view of the major interests at stake, the Council must make the Code mandatory. This implies that the Commission must have powers, after the interested parties have had an ample objective say, to ensure that each Member State observes the Code. As has already been pointed out in this Study, the risks attached to nuclear plants transcend political frontiers and may affect people living outside the Member State in which the plant is located, as well as those living in that State. The fact that the Code is to be binding on the Member States implies a certain increase in the powers of the Commission in this vital area. Although the Euratom Treaty empowers the Community to regulate radiation protection, etc., safety rules and licensing procedures have remained a national matter. In view of the factors analyzed in the first part of this Study,

Article 203 of the Euratom Treaty and Article 235 of the EEC Treaty will doubtless have to be invoked to bring safety rules more within the ambit of the Community.

2.2.3. The Economic and Social Committee and the European Parliament must be involved in the drafting of the Code and must be consulted on any subsequent amendments. From the outset the Code must be designed so that it can be up-dated in the light of advances stemming from operating experiences and research.

2.2.4. The Code must solely reflect safety requirements in the strict sense and must not infringe on personal and public liberties (free choice of employment, right to work, employment possibilities, etc.).

2.2.5. The Code must lay down minimum safety requirements for nuclear plants and for the protection of occupationally-exposed workers and the general public against radiation.

2.2.6. Safety of workers and the public must be the overriding criterion when technical and economic decisions are taken. This implies that decisions will also have to take account of environmental damage and long-term hazards.

2.2.7. The Code must be adaptable, not rigid. It must be able to keep pace with progress made as a result of research or of practical experience in the operation of installations. Therefore, the Code must be based on constantly updated data and directly related research programmes covering, for example, nuclear safety technology (reactors, reprocessing of waste, storage) as well as biology and medicine (cumulative long-term effect of regular low doses of radioactivity, internal contamination caused by the absorption of different radionuclides, biological concentration in food chains).

The purpose of this principle is to eliminate the obvious objection to use of the word "Code". The codification of safety rules is inconceivable unless it keeps abreast of progress and is linked to an extensive research programme with considerable financial backing. This does not mean, however, that the rules will be in a constant state of flux. In order

to allow sound planning of large-scale investments, the basic safety standards must not be amended constantly. On the other hand, safety rules must be adapted to advances in scientific and technical knowledge.

2.3. Geographical Area Covered

The Code would have to be valid in all Member States.

2.4. Activities Covered by the Code

2.4.1. The Code must cover all fields of nuclear energy research and application, viz.

- uranium (and, possibly, thorium) mines;

- ore-processing plants;

- uranium-enrichment plants;

- fuel fabrication installations;

- reactors :

  . present-day nuclear power stations (HWR, GGR, LWR),
  . future nuclear power stations (HTR, FBR),
  . small-scale reactors (especially for the production of heat),
  . research and experimental reactors;

- nuclear research installations;

- storage of irradiated fuel;

- transport of irradiated fuel and waste;

- reprocessing of irradiated fuel;

- storage and disposal of radioactive waste;

- decommissioning and dismantlement of nuclear plants.

2.4.2. Radioisotopes are used outside the field of nuclear research and the nuclear industry for medical, industrial, agricultural and other applications. The relevant safety standards must likewise be aligned throughout the EEC, but this subject is not a matter for the present Study.

2.5. Field of Application of the Code

The points set out below have a bearing on the problems listed under 1.2.4.

2.5.1. Protection of the general public and the environment

a) Criteria for selecting sites in the light of (i) the natural and industrial environment, and (ii) population density.

b) Standards for discharge of warm water into lakes, rivers and oceans (thermal pollution).

c) Implications for technical standards of research into the climatic effects of tower cooling.

d) Measures to ensure that radioactive emissions do not constitute a hazard for workers and the general public (minimum release of gaseous and liquid radioactive wastes to the environment from all nuclear installations starting with uranium mines and up to and including waste dumps).

e) Details of Member States' licensing procedures for the construction and operation of nuclear plants, and technical aspects of such authorizations.

f) Procedures for informing and consulting the general public its elected bodies and representative organizations.

g) Measures for physical protection of installations.

h) Procedures for authorizing transport operations (including from the physical protection angle).

i) Special provisions for installations in frontier areas.

It is necessary to pinpoint the responsibilities to be shouldered at local, regional, national and EEC level with regard to each of the above points.

2.5.2. Safety and protection of workers in nuclear plants and installations :

a) Training and briefing of workers with the assistance of their trade union organizations by independent experts employed or recognized by the authorities.

b) Definition of uniform standards for protection against ionizing radiation, to be adhered to by all EEC Member States (minimum rules).

c) Checking of provisions so as to determine to what extent applications of the findings of recent research can help to protect the general public and workers from exposure to radiation.

d) Need for each nuclear plant to have its own radiation protection service coming under the responsibility of the plant operator but with the authority and means to act at any moment independently of operating and production units. The Committee welcomes the fact that considerable account of its suggestion on the creation of radiation protection services has been taken by the Council Directive of 1 June 1976 laying down the revised basic safety standards for the health protection of the general public and workers

against the dangers of ionizing radiation. The Directive states that "The creation of a specialized radio-protection unit shall be required for all establishments in which there is a serious risk of exposure or contamination. The unit, which may be shared by several establishments, shall be distinct from production and operations units".

e) Special measures for outside labour working in nuclear plants (these workers are often most at risk. They are not always adequately trained and briefed with regard to hazards, and their medical supervision is at present very difficult) : Operators must be made responsible for checking the health of these outside workers and measuring the radiation levels to which they are exposed when working in nuclear plants. This would mean that their medical records would have to be at the operators' disposal. These requirements are already satisfied to a large extent in some Member States.

f) Introduction of a "nuclear passport" for all workers in the nuclear industry. The passport would state where the holder has worked and the radiation doses to which he has been exposed. To all intents and purposes, this system is already being operated in a number of Member States. Two copies of the nuclear passport should be kept, one by the holder and the other by the medical service concerned. Both copies should be constantly updated.

g) Standardization of the instruments and units used for measuring radiation doses, in order to facilitate checks and make statistical studies possible.

2.5.3. Technical aspects of safety

a) Definition of minimum standards for the discharge of radioactive effluents.

b) Definition of minimum plant-safety conditions, consistent with the proposals currently being drafted by the International Atomic Energy Agency :

- Intrinsic safety,

- Acts of God (earthquakes),

- Acts of human aggression (theft of fissile materials, sabotage, conventional and other forms of armed conflict),

- Explosions, plane crashes.

c) Need for physical protection standards for nuclear materials, enforceable throughout the Community.

d) Definition of rules for the shipment of fissile materials.

Part 3

General Problems Posed by Nuclear Safety

3.1. Nuclear Safety and Public Opinion

3.1.1. When the risks involved in the production of nuclear energy are being calculated and decisions are being taken on whether or not these risks are acceptable, the most important, intractable and least-studied problems are often more of a social and moral than a technical nature. There is an urgent need to provide for the general public clear, comprehensible and objective information to which every citizen has access. It is up to the experts to provide the information needed to enable the issues to be debated. The debates must be thorough and all the different arguments must be given a hearing. The experts must describe the situation as it is, and stress the advantages, hazards and uncertainties. In the final analysis the decisions which have to be taken are political and involve the whole of society. It follows that everyone, and not just the experts, must have access to information in order to be able to give their views through democratic channels, through their elected representatives.

3.1.2. We would illustrate this need by listing three fields in which nuclear safety has particularly marked social and political implications :

- plans for emergency action;

- siting of nuclear plants;

- supervision by public authorities.

3.2. Plans for Emergency Action

3.2.1. In keeping with the Safety Code, the Member States must retain sole responsibility for drawing up, and if necessary implementing, plans for intervention and emergency action. To preclude panic in the event of accidents (even minor ones), the members of the public directly concerned must be involved adequately and to the extent necessary for these plans to be implemented in practice.

3.3. Siting of Nuclear Plants

3.3.1. Decisions on the siting of nuclear plants must be submitted to elected bodies and to the general public for their views. Above all, those sections of safety reports which do not jeopardize industrial secrets must be made public. In the Community in particular, a different problem is posed by the siting of nuclear plants in densely-populated areas or in industrial zones. In such instances, the large scale evacuation of people following even a minor accident is a risky matter. Furthermore, a safety threat

to nuclear plants is posed by the possibility of accidents in conventional industrial installations (chemical works, petroleum plants and gas piplines where there is the risk of fire or explosion). Special attention should be paid to this problem at EEC level, in view of the plans to build nuclear plants in border areas.

3.3.2. On 10 December 1976 the Commission sent the Council two proposals entitled "Consultation at Community level on the Siting of Power Stations" and "The Introduction of a Community Consultation Procedure in respect of Power Stations likely to affect the Territory of Another Member State" (13). The Committee delivered its Opinion on these proposals on 30 March 1977 (14).

3.4. Supervision by Public Authorities

3.4.1. Compliance with safety measures and provisions must be supervised. We must therefore consider how society and the public authorities can oversee safety in the nuclear industry.

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(13) OJ No. C 31 of 8 February 1977
(14) Doc. CES 382/77

3.4.2. In this connection all Member States should set up one or more public nuclear plant safety bodies. These would be responsible for studying and applying the Community Code and be answerable to the appropriate Ministry. Committees composed not only of leading scientific figures but also of representatives of trade unions, employers' associations and professional bodies involved in the implementation of safety measures would assist the Ministry.

3.4.3. Safety reports should be drawn up periodically on each nuclear plant. These reports should review the extent to which the safety measures recommended in the Community Code have been implemented and should also list any problems which have arisen in this area. The Reports should be forwarded to the authorities concerned and to the "committees" assisting the "public nuclear plant safety bodies".

3.4.4. Since this is an area of activity where the "public service" aspect is of overriding importance all nuclear plants and all activities associated with the fuel cycle must be directly supervised by the public authorities, particularly from the safety angle.

3.4.5. In view of the long-term safety requirements, it is moreover vital that, in the present state of industrial applications, the reprocessing of irradiated fuel and the storage of waste should be placed under direct public responsibility, as long as these activities remain inseparable.

3.4.6. The Community, acting through national bodies, must supervize the international transport of fissile materials.

3.4.7. The Community should therefore enact minimum provisions stating to what extent national supervisory bodies should inspect nuclear plants and how often. Such inspections should cover not only plants but also the organizational side. Findings from inspections should be analysed by the Community authorities and made available to all nuclear plant operators.

Chapter 4 - Conclusions

4.1. While noting its own comments on 29 May 1975 (Opinion on the Technological Aspects of Nuclear Safety) on the efficiency of safety measures and systems used so far in respect of the building and running of nuclear plants, the Committee notes that the Opinion stressed the need for Community rules in this area. The Committee asked "whether the proposed measures will be sufficient to enable the early introduction of common laws, regulations and administrative provisions, and common nuclear technology rules and directives bearing in mind that the Community is responsible not only for safety and protection of public health, but also for the operation of the common market".

4.2. The same Opinion adds : "The Commission should also make a positive endeavour not merely to formulate recommendations of a general nature under Article 124 of the EAEC Treaty, but also to create the conditions necessary for the issuing of directives and regulations in this field, in order that it may thereby lay down minimum standards for all nuclear plants in the Community".

4.3. The Committee therefore thinks that the present Study's recommendations for a Community nuclear safety code are consistent with (i) its previous pronouncements, and (ii) Commission action in this area, in particular since 1973. It should be added that a Nuclear Safety Code applicable to the Member States is not a stumbling block to wider international cooperation within, for example, the International Atomic Energy Agency. Indeed the opposite is true.

4.4. The Committee consequently recognizes the need for Community rules, given the fact that nuclear safety problems must be tackled in parallel with the progress of medium- and long-term energy policy.

4.5. The public debate to which these problems give rise in national parliaments and in the European Parliament is of direct concern to the population at large.

4.6. On many points these problems are so important as to transcend the Community framework.

4.7. The present Study has been confined to nuclear safety. It has placed the main emphasis on the overriding need for safety rules to be aligned at Community level.

4.3. Despite the major research effort, the progress made with Community and national rules, the experience gained and the precautions of all kinds that have been taken in this area, there are still divergences which should be either explained and accepted, or else abolished by Community rules.

4.9. In view of the nature of the risks and the possibility of excessive divergences arising in both technological and radiological protection as a result of the scale of current nuclear programmes and the rapid advance of technology in this particular field, a Community Code must be worked out on the basis of joint concertation. It should comprise minimum rules whose observance would be supervised. Account should also be taken of the progress of work currently being carried out in this area by the International Atomic Energy Agency.

4.10. The basic objective of the Code would be to allow optimum development of the nuclear industry from the point of view of safety, thus promoting the use of nuclear energy for the benefit of society as a whole. Tighter safety requirements have a not inconsiderable impact on the cost of nuclear plants and on lead times. Although the Committee is aware of this aspect, the safety of workers and the public at large must come first.

A P P E N D I C E S

Appendix I

COUNCIL RESOLUTION OF 22 JULY 1975 ON THE TECHNOLOGICAL PROBLEMS OF NUCLEAR SAFETY

The Council of the European Communities,

HAVING REGARD TO the Treaty establishing the European Atomic Energy Community;

HAVING REGARD TO the Opinion of the European Parliament (1);

HAVING REGARD TO the Opinion of the Economic and Social Committee;

WHEREAS the Commission has forwarded to the Council a communication and a general report on technological problems of nuclear safety;

WHEREAS it is necessary to keep the public adequately informed on this subject;

WHEREAS nuclear power has a considerable part to play in supplying energy to the Community;

WHEREAS the technological problems relating to nuclear safety, particularly in view of their environmental and health implications, call for appropriate action at Community level which takes into account the prerogatives and responsibilities assumed by national authorities;

WHEREAS by aligning safety requirements, the national authorities responsible for nuclear safety and constructors and energy producers will be able to benefit from a harmonized approach to the problem at Community level;

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(1) OJ No. C 128 of 9 June 1975, page 24.

WHEREAS nuclear safety problems extend beyond the frontiers not only of Member States but of the Community as a whole, and it is incumbent on the Commission to act as a catalyst for initiatives to be taken on a broader international plane.

HEREBY ADOPTS THIS RESOLUTION :

The Council

1. requests the Member States as well as the licensing authorities and the safety and inspection authorities on the one hand, and the operators and constructors on the other, and finally the agencies responsible for applied research programmes to continue to collaborate effectively at Community level;

2. agrees to the course of action in stages indicated below by the Commission in respect of the progressive harmonization of safety requirements and criteria in order to provide an equivalent and satisfactory degree of protection of the population and of the environment against the risks of radiation resulting from nuclear activities and at the same time to assist the development of trade on the understanding that such harmonization should not involve any lowering of the safety level already attained; taking into account the state of industrial development in the respective families of high-power nuclear reactors, these stages involve listing and comparing the requirements and criteria applied and drawing-up a balance-sheet of similarities and dissimilarities formulating as soon as possible recommendations pursuant to the second indent

of Article 124 of the EURATOM Treaty, and subsequently submitting to the Council the most suitable draft Community provisions;

3. agrees to strengthen Community efforts to coordinate applied research programmes in order to make the best possible use of the resources available in the Community and the Member States both technically and financially whilst avoiding as far as possible unnecessary duplication; these efforts shall be aimed at improving systematic exchanges of information, promoting concerted action and cooperation between specialized bodies and institutes and stimulating where appropriate the development of Community programmes;

4. approves of the methods used and advocated by the Commission, namely, meetings of working parties of specialized experts, exchanges of information on specific operational problems and analytical studies and syntheses with which these experts are associated;

5. notes that the measures described above may require appropriations in order to finance analyses and syntheses and the appropriate technical secretariat;

6. requests the Member States to notify the Commission of any draft laws, regulations or provisions of similar scope concerning the safety of nuclear installations in order to enable the appropriate consultations to be held at Community level at the initiative of the Commission;

7. requests the Member States to seek common positions on any problems concerning the harmonization of requirements and criteria and the coordination of research into nuclear safety being dealt with by international organizations;

8. requests the Commission to submit annual reports on the progress made and the Member States and the Commission to continue and strengthen their efforts to ensure that the public is given the best possible information about both national and Community action in the field of nuclear safety.

Appendix II

"DIRECT" RESEARCH PROJECTS IN THE FIELD OF NUCLEAR SAFETY INCLUDED IN THE MULTIANNUAL RESEARCH PROGRAMME OF THE JRC FOR THE PERIOD 1977-1980 (1)

1. Reactor Safety

The programme comprises six projects covering the following research :

- reliability and risk assessment;
- light water reactor loss of coolant accidents, out-of-pile studies and in-pile studies;
- liquid metal fast breeder subassembly thermohydraulics;
- fuel coolant interactions and core melt-down;
- dynamic structure loading and response;
- structural failure prevention.

2. Plutonium Fuels and Actinide Research

The programme comprises three projects covering the following research :

- utilization limits of plutonium fuels;

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(1) Source : Doc. COM(76) 171 final.

- plutonium and actinide aspects of the safety of the nuclear fuel cycle;

- actinide research.

3. Nuclear Materials and Radioactive Waste Management

The programme comprises four projects covering the following research :

- evaluation of the long-term hazard of radioactive waste disposal;

- chemical separation and nuclear transmutation of actinides;

- fuel materials management;

- studies for decontamination of reactor components.

Appendix III

"INDIRECT" COMMUNITY RESEARCH PROJECTS IN THE FIELD OF NUCLEAR SAFETY

1. Biology - Health Protection ('Radiation Protection' Programme)

Council Decision : 15 March 1976 (1)

Duration of Programme : 5 years (1 January 1976 to 31 December 1980)

Upper Limit for Expenditure commitment : 39 million u.a.;

Staff : 68 persons (and 20 man/years for the infrastructure of the JRC/Ispra)

Legal Basis : Article 7 of the EURATOM Treaty

Gist of the Programme

The purpose of the programme is to supplement, broaden and deepen the scientific and technical knowledge necessary for (i) determining and updating the permissible radiation levels for man and the permissible levels of contamination of the various components of the environment, and (ii) improving the practical organization of radiation protection by the Member States.

(1) (Decision No. 76/309 Euratom) OJ No. L 74 of 20 March 1976, page 32.

This aim includes studies on the paths which radioactive contaminants follow in man and the environment, on the effects of radiation on living matter, and on dosimetric methods and instruments.

The activities are to be carried out mainly under contracts of association or shared-cost contracts, and partly by the Commission's Biology Group at the Ispra establishment.

2. Management and Storage of Radioactive Waste

Council Decision	: 26 June 1975 (2)
Duration of Programme	: 5 years (1 January 1975 to 31 December 1979)
Upper Limit for Expenditure Commitments	: 19.16 million u.a.
Staff	: four persons
Legal Basis	: Article 7 of the EURATOM Treaty

Gist of the Programme

The purpose of the programme is the joint development and perfecting of a system of management of radioactive waste produced by the nuclear industry which, at its various stages, affords man and his environment the best protection possible.

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(2)(Decision No. 75/406 Euratom) OJ No. L 178 of 9 July 1975, page 28.

In order that the Commission may submit suitable proposals at the earliest opportunity, the programme will seek to promote :

A. Work to solve certain technological problems posed by the processing storage and disposal of radioactive waste.

Processing

- medium-activity solid waste : coating with plastic resins;

- high-activity solid waste : decontamination and conditioning of irradiated fuel-element cladding;

- high-activity solid waste : immobilization in a metal matrix of calcined waste from fission products;

- plutonium-contaminated solid waste : incineration process;

- comparative study of the properties of various materials suitable for the immobilization of high-activity waste.

Storage and disposal

- storage of solidified radioactive waste in engineered structures;

- disposal of radioactive waste in suitable geological formations, including those formations currently being studied;

- storage of gaseous waste.

Study of an advanced management model

- separation and recycling of long life waste (actinides).

B. Work contributing towards the definition of a general framework (legal, administrative, financial) for the implementation of radioactive waste storage and disposal measures :

- review of problems posed by the management of radioactive waste which cannot be solved under existing international legal, administrative and financial provisions and proposals for solutions;

- study of principles which should govern the management of radioactive waste.

The work described in A and B will in the main be carried out by means of contracts.

3. Plutonium Recycling in Light-Water Reactors

Council Decision	:	17 December 1974 (3)
Duration of Programme	:	four years (1 January 1975 to 31 December 1978)
Upper Limit for Expenditure Commitments	:	4.5 million u.a.
Staff	:	three persons
Legal Basis	:	Article 7 of the EURATOM Treaty

Gist of the Programme

The purpose of the programme is the joint acquisition of data to ensure judicious use of plutonium prior to the operation of fast-breeder power stations on an industrial scale. The parts of the programme that have to do with nuclear safety in particular are :

a) Monitoring and safety

Some problems (e.g. accidents due to the loss of coolant) associated with the monitoring and safety of light-water reactors differ from reactor to reactor, depending on whether plutonium or uranium is used as fuel. There is a need for a comparative technical study into the problems posed in the cores of plutonium-fuelled reactors, with reference to the monitoring and safety systems and health

(3) (Decision No. 74/642/EURATOM) OJ No. L 349 of 28 December 1974, page 61.

protection equipment, in order to determine what changes must be made. This study should also show to what extent it would be possible, at a later date, to return to the use of uranium fuel.

b) Environmental Problems

It was stated in the Commission's memorandum which formed the basis for the Council's Decision that it would be useful to compare, throughout the Community, the problems encountered in :

- obtaining operating licences for, and operating, fuel fabrication plants and plutonium-fuelled power stations;

- transporting plutonium in the raw state (nitrate or oxide?) or in the form of manufactured fuel elements;

- storing plutonium (including "requalification");

- attempting to ensure protection against any act of sabotage or piracy;

and to seek a solution to these problems either through research or by means of tests agreed on jointly.

A programme to align regulations and to brief the public may also prove useful.

European Communities - Economic and Social Committee
"Community nuclear safety code"
Study of the Economic and Social Committee
Brussels : General Secretariat of the Economic and Social Committee

1977 - 50 p.
DK, D, E, F, I, N.

In its Study, the Committee calls for a nuclear safety code comprising a set of minimum rules that would be binding on each Member State. The code would cover all activities in the nuclear sector and would give absolute priority to the safety of nuclear workers and the general public.

Many of the decisions on nuclear energy hazards are more of a social and moral nature than a technical one. The Committee therefore stresses the need to involve the general public. There must be ready access to reliable and comprehensive information. Decisions on the siting of nuclear power stations must be submitted to elected bodies and to the general public for their views.

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