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# COMMISSION OF THE EUROPEAN COMMUNITIES

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## THE FUTURE ACTIVITIES OF THE JOINT RESEARCH CENTRE

(Communication from the Commission to the Council)

COM(83) 107 final

# THE FUTURE ACTIVITIES OF THE JOINT RESEARCH CENTRE

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## I N T R O D U C T I O N

The Council has before it a communication from the Commission on the JRC's programme for 1984-87, COM (82) 250 final (7359/82 - AT0 46 of 28 May 1982) a communication from the Commission on the revision for 1983 of the 1980-83 programme, COM (82) 489 final (9107/82 - AT0 72 of 6 August 1982) and a report from the Permanent Representatives Committee, 11550/82 - AT0 94 of 9 December 1982, which was used as the basis for discussion on 13 December 1982.

Meeting on 8 February, the Council of Research Ministers took note of the report from the three experts whom the Commission has consulted at its request. On the basis of the report it asked the Commission to let it have, for its next meeting, detailed proposals on a JRC programme which would not include Super-SARA.

In response to this request the Commission now presents proposals for programme guidelines which, according to the Commission, effectively bestow upon the JRC "a central role in the Community's research strategy", entrusting it with "work of common interest based on current resource levels". These proposals have been worked out on the "broad lines set out in the Commission's working document" and include, in particular, "measures aimed at improving staff mobility".

The main features of the new guidelines for the JRC's programme are a substantial development of research on safety in general, both nuclear and non-nuclear, and initiatives with potential in the fields of thermonuclear fusion reactors and remote sensing. They emphasize the fact that the Ispra Establishment is available for housing or developing large machines of interest to the Community.

Annex A goes into some detail on the use the Commission intends to make of the resources originally earmarked for the Super-SARA project.

Annex B describes the steps which will have to be taken with regard to the ESSOR reactor.

On the basis of the Council's conclusions the Commission has also prepared specific proposals for improving the decision-making process at the JRC. These proposals are set out in a separate document.

The Commission's communications have been brought to the attention of Parliament as well, to enable it to follow the progress of the work from the beginning and to decide right away on how it will contribute to the major decisions on the future of the Joint Research Centre in the development of the Community.

## I. PART ONE - THE NATURE AND ROLE OF THE JRC

The Council has confirmed that the JRC will have to continue to play a central role in the Community's research strategy. The JRC's main purpose is therefore to promote and/or conduct significant activities of a centralized nature that the Community wishes to have carried out, on a Community basis, with a JRC contribution. To put this intention into practice there has to be a commitment on the part of the Council acknowledging that the following conditions have to be met :

### 1. The JRC's activities must be on a significant scale

The JRC's programme must not be simply a collection of a large number of minor activities. It must, instead, take account of the substantial facilities available to the Community within the JRC. The activities carried out must be on a scale commensurate with the size of the JRC in general, and with that of each of its establishments in particular. A look at the programme reveals that a large proportion of the projects placed with the Ispra establishment are on a scale which would be beyond the capacity of any of the other three establishments.

### 2. The JRC must not work in isolation

It is not simply a matter of deciding on projects for the JRC which are within its capability. The projects must in addition have significance in relation to all similar activities under way within and even outside the Community. This need for the Community action

to be consistent will cause the Commission to look for a role for the JRC whereby it "federates" certain projects being undertaken at national level or even becomes a catalyst for the development of new national activities. This is the role which the JRC has played, and continues to play, in the field of remote sensing from space.

3. JRC activities must be an integral part of the Community's general R & D strategy

The activities in the JRC's programme which are described in this document are all in keeping with the opinions of the framework programme defining the Community's overall R&D strategy.

These activities correspond to the following options set out in the framework programme :

a) Agricultural competitiveness :

- Remote sensing : study of soil occupation;  
models for management of rural areas;  
viticulatural records;  
substitution models.

b) Industrial competitiveness :

- Reference materials and methods
- Solar component testing
- Materials for use at high temperature
- Data processing

c) Improvement of energy source management :

- Nuclear safety
- Fusion technology
- Renewable forms of energy and harnessing energy
- Materials for use at high temperature

d) Scientific and technical support for development :

- Remote sensing : agricultural productivity (Sahel)  
desert formation  
forestry protection
- Education and training

e) Living and working conditions :

- Nuclear and non-nuclear safety
- Environmental protection

The Commission's R&D activities will be described in detail in the action programmes which are in preparation. The research carried out by the JRC will be an integral part of these action programmes.

4. The decision-making process must be improved

To enable the JRC to perform the role entrusted to it by the Council, it must be given powers to take decisions in the technical and managerial fields that are commensurate with those exercised by other research ventures in general, and European undertakings such as JET or CERN in particular. In line with the Council's conclusions on this specific point, the Commission has prepared some proposals which, as mentioned above, are the subject of a separate communication.

## II. PART TWO - THE PROGRAMMES : MOTIVATION AND CONTENT

The JRC programme guidelines presented here are different from those so far proposed (see ATO 46) in that the Super-SARA project is no longer included and that the Commission proposes, for reasons which are elaborated upon below, to make use of the resulting flexibility in the following ways :

- a) a considerable proportion of the finance will be devoted to studying safety as a whole, both nuclear and non-nuclear, this being the dominant theme of the programme.
- b) Thermonuclear fusion technology will also be the subject of a special development.
- c) The other areas of research will be maintained at approximately the same level as before with the exception of the "Hydrogen" programme which has achieved its aims and will not be continued and the "Remote sensing" programme which will be intensified.

These activities will concentrate on :

- the development of remote sensing methods and their application to problems of the environment, agriculture and aid to development;
- support to industry in the materials and reference substances field;
- solar energy and harnessing energy;
- data processing.

These research activities represent the specific contributions of the JRC to the Community's general R&D policy as defined in the outline programme.

- d) Finally, the JRC will continue with other activities already under way, such as the exploitation of the HFR and training.

## 1. Safety and the environment

Working document SEC (83) 198, placed before the Council by the Commission, contained several ideas put forward, in particular, by the European Parliament on how to fill in certain gaps in Community research.

Parliament placed special emphasis on the following points :

- safety in general (nuclear and non-nuclear);
- an agency for innovation and assistance to inventors;
- promotion of centres of excellence.

The research needs identified, the existing capabilities of the JRC and activities currently under way bring the Commission to the conclusion that the "safety in general" option is the most realistic and most highly motivating solution at the present time.

For several years, the JRC has played a central role in studies on nuclear safety. In close cooperation with the Member States, it conducts experiments or studies of a central nature and of general interest which are not performed in the laboratories of the Member States. For example, mention may be made of the LOBI experiment, the in-pile PAHR studies, the development of a European fast-reactor accident code, the setting up of a European data bank on the reliability of nuclear power-station components and the assessment of the risks associated with the continental storage of radioactive waste.

In the guidelines for the 1984-87 programme, it is proposed that the experience acquired in these safety studies be extended to the non-nuclear field.

In the Commission's view, sufficient consideration has so far not been given to research needs in the area of safety and the environment which justify concentrating a considerable part of the JRC resources on this topic, which will become the main topic in its programme.

The European Parliament has encouraged the JRC to undertake studies on safety in general by approving Mr. Linkhor's report on the common research policy by a massive majority.

Like Parliament, the Commission considers that this type of research should benefit from the situation of independence enjoyed by the Community's JRC.

The research topics that will be taken into consideration in the next programme are as follows :

- reactor safety;
- safety of the fuel cycle;
- safety in industrial activities with a high level of risk (chemistry, biology, etc.).

This programme on safety and the environment accounts for more than 60 % of the overall activity at the JRC.

## 1.1. Nuclear Safety

This topic will account for about 45 % to 50 % of the activity at the JRC.

### 1.1.1. Reactor safety

Most of the principal activities that already formed part of the programme, apart from Super-SARA (see reorientation proposal ATO 46), will be intensified or developed further.

They will account for about 25 % to 30 % of the activity at the JRC.

a) Water\_reactors

After the termination of the Super-SARA project, it will still be important for the Community to acquire through other channels the information that that project was originally intended to provide. To this end, the Commission proposes that an international team be set up for the analysis and evaluation of the results expected from major experiments throughout the World such as LOBI, REBECCA, PHEBUS, PBF, NRU, etc.

This measure was recommended by the three independent experts consulted by the Commission in order to obtain an assessment of the Super-SARA project.

New studies dealing with containment-structure safety will be initiated :

- in particular, a study will be made of the reaction of structures to dynamic stresses produced by over-pressure resulting from a loss of coolant, to gas explosions or to external events (missiles, earthquakes). The advisability of installing a large vibrating platform in order to study dynamic and seismic effects on structures will be examined. Such a facility could be used for similar studies in the field of non-nuclear safety, which is dealt with further on. A study will also be made of the containment structure's capacity to retain fission products and aerosols.

The projects of a central nature that are currently under way will be continued and reinforced with some of the staff from the Super-SARA project, particularly the following projects :

- Reliability and risk analysis : emphasis will be placed on the collection and analysis of reliability data from power stations (European Reliability Data System), on "Benchmark" exercises concerning the reliability of certain systems and

on the improvement of probabilistic analytical methods (PRA) with a view to applying them to a European probabilistic risk analysis system in cooperation with UNIPEDE.

- Study of loss-of-coolant accidents in the LOBI facility. Expansion of the current programme to the study of special transients and to the man-machine interface. Participation in the validation of European accident codes (for example, CATHARE, DRUFAN, etc.).
- Studies on fracture mechanics, diagnostic methods (PISC) and the analysis of component lifetimes. Expansion to include the examination of irradiated components from decommissioned reactors.

b) Fast reactors

The activities which the Commission had considered discontinuing in the reorientation proposal (ATO 46) will be continued and intensified.

The JRC will concentrate on :

- the development of the European Accident Code (EAC) in cooperation with national projects. In order to make this Code as realistic as possible, it is proposed that the team participate in processing the results of major European Irradiation experiments (Cadarache, Mol, etc.);
- the development of physical models and their experimental validation for accident sequences that are still poorly understood;
- the study of phenomena associated with partial core meltdown :

in particular, the in-pile PAHR experiments in the reactors at Grenoble and Mol will enter the implementation phase as soon as the new programme starts. A team for analysing the results of these experiments will be set up at Community level. The out-of-pile PAHR experiments in the FARO facility at Ispra can also start at the beginning of the programme.

- the study of the behaviour of materials and mechanical components will also be continued. A special effort will be devoted to the development of two- or three-dimensional structure codes.

### 1.1.2. Safety of the fuel cycle

This part of the nuclear safety topic corresponds to two of the objectives of the general Community policy : the monitoring and management of radioactive waste and the Euratom safeguards concerning the non-proliferation of fissile materials. It also covers research on actinides and the safety of the actinide cycle, a field in which the Institute for Transuranic Elements in Karlsruhe has become a centre of excellence.

This research work accounts for about 20 % to 25 % of the activity at the JRC.

- a) The programme on radioactive waste fits into the twelve-year (1980-92) Community plan of action. This programme will be slightly expanded in comparison with the preceding proposal (ATO 46). The expansion will concern studies on improvements to waste processing, with particular regard to the separation of alpha-emitting waste. The JRC can make use of the ADECO hot cells in the ESSOR complex for these studies.

The Commission also proposes that non-destructive testing methods be developed for the quality assurance of conditioned radioactive waste. Here as well, the hot cells of the ESSOR complex could serve as a test laboratory.

The remaining activities will be concentrated on :

- an analysis of the risks of continental geological disposal. Special importance will be accorded to the setting up of a data base and the experimental validation of models prepared for the various barriers.
- the feasibility and safety of disposal by means of burial in the sediments of the ocean floor. This involves long-term research work which will require the development of broadly based international cooperation. Such work has already been started by the NEA, whose working party on "sub-seabed disposal" constitutes the reference point.

- b) The programme on the safeguarding and management of fissile materials is intended to provide the information required by the Directorate for Euratom Safeguards and by the European operators so that they can comply with their obligations under the Euratom and Non-Proliferation Treaties.

Emphasis will be placed in future on the technological transfer of methods and instruments developed in the laboratory to industrial-scale plant. Work on the development of software for the processing and transmission of materials-accounting data will be intensified as will studies on the integration of safeguarding activities.

The main projects concern :

- Methods and instruments for determining the presence of fissile materials and for containing and supervising them;
- The processing, transmission and validation of materials-accounting data;
- The integration of safeguarding activities.

- c) The programme on nuclear fuel and actinide research is implemented by the Institute for Transuranic Elements in Karlsruhe (ITE). That institute is currently playing a central role in Europe in actinide research. The Commission's intention is to confer the status of leader on the Karlsruhe Establishment where basic studies on fuel are concerned. In that capacity, the laboratory will have to assume responsibility for studies on the source and release of fission products under severe fuel-damage conditions (SFD), which will be conducted in parallel with the fuel behaviour analyses which form part of the programme on Reactor Safety (II.1.1.1.).

The resources allocated to this programme are unchanged.

The four projects listed below are covered by the programme :

- Operating limits of nuclear materials;
- Safety of the actinide cycle;
- Research on actinides, comprising theoretical and experimental work on crystal chemistry and the solid-state physical properties;
- Studies on the source and release of fission products under accident conditions.

1.2. Non-nuclear safety and the environment (from 10 % to 15 % of the activity at the JRC)

In this field, the Commission proposes to give a new dimension and a consistent direction to the activities and techniques initiated under several of its previous programmes in order to develop a new programme on the safety of non-nuclear installations in compliance with the Resolution of the European Parliament.

This programme concerns three additional aspects :

- technological assessment of the overall risk;
- technological assessment of the individual risks;
- management of dangerous industrial wastes.

1.2.1. Where the overall risk is concerned, the work involves the development of techniques for assessing technologies which may give rise to the release into the environment of products dangerous to man and the ecosystem.

To a large extent, this programme takes over the activities of the 1980-83 environment programme together with the sea-surveillance part of the programme or remote sensing by increasing their scope within the framework of the central topic "non-nuclear safety" (atmospheric micropollutants, acid rain, coastal sediments, etc.).

1.2.2. The studies relating to the technological assessment of individual risks, are, on the other hand, a new activity transposed from techniques developed in the field of nuclear safety. They will cover probabilistic analysis, reliability data banks, studies on mechanics and the detection of faults in materials and structures in industrial processes under severe operational conditions (high temperatures, vibrations, catastrophic external events and their impact on nuclear and non-nuclear structures), the supervision of installations, man-machine communication, and assessment of the "source term" and the release into the environment of dangerous substances which are covered by Community Directives.

1.2.3. The studies on the recovery, conditioning and storage of dangerous industrial wastes are obviously based on the techniques developed in the field of radioactive waste : assessment of the long-term reliability of waste containers, study of the migration of dangerous substances in geological formations in which waste is buried, recovery of substances released accidentally into the environment (for example Seveso) with a view to rehabilitating the soil.

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It is in the field of non-nuclear safety that the short-term redirection of the JRC programme is taking place in the most dramatic fashion, foreshadowing at this point the long-term directions which are part of the major guidelines in the Commission's proposal.

## 2. Thermonuclear Fusion Technology

The European programme on Thermonuclear Fusion comprises all the relevant research projects in Europe, including the JET Project whose execution is integrated at Community level.

The JRC contribution to the Fusion programme covers the following fields :

- Conceptual studies of post-JET devices (INTOR/NET). Specifically, the JRC will provide the NET Project Group with an important contribution in the form of a "system study".
- Investigation and development of materials for the inner walls of post-JET devices. Behaviour of these materials under irradiation elicited from experiments in the HFR at Petten and the light-ions cyclotron at Ispra. Moreover, in this field of irradiations the Community will have to devise a policy relating to the utilization of intense neutron sources (under construction in the USA or to be constructed in Europe). The Commission proposes that the JRC be assigned the central role in the study of this problem.
- Studies of the breeding blanket. JRC activity in this field is concentrated on liquid breeding blankets (e.g., Li-Pb).

The commission hopes to extend the scope of the JRC in this programme and develop considerably the fusion reactor safety studies which have just been initiated under the present programme.

The JRC will apply the risk analysis methods developed in the context of fission reactor safety and will evaluate the feasibility of carrying out mock-up safety experiments. The effort will be applied to a systems study and, in particular, to the combined risks.

These studies are the more urgent in that very little has been done so far in the Community on the "licensing" of fusion reactors. The Commission proposes that the JRC be assigned the leading role in regard to the specific topic of "licensing".

### Ignitor

Since the Ignitor experiment was the subject of a feasibility study which has been examined by an "Ignitor Assessment Panel" set up by the Commission and since this Panel has found such a device to be of interest and has recommended

that a study of the construction project be carried out by starting with the feasibility study which is now available, the Commission will submit a Proposal on the execution of a project study by an international team centred at Ispra to the Fusion Programme Advisory Committee (F.P.A.C.).

The tritium problem. Contrary to what has been done in other parts of the world (U.S.A. and USSR), the Community still has no specific civil solution to the tritium handling problem in fusion reactors. The Commission intends to broaden the study of this problem. The conclusions of this study will be submitted to the FPCC with a view to the JRC being entrusted in due course with the task of setting up a specialized laboratory on the subject.

When all the proposals are implemented, the JRC's contribution to the Fusion programme will represent about 10 % of the JRC's volume of work under the present programme.

### 3. Other areas of research

This heading covers the topics dealing with remote sensing, new energy sources, support to industry and computerized data-processing. Of these four topics, only remote sensing is being developed on a substantially increasing scale.

On the other hand, although work on the three other topics has been pegged at existing levels, a process of internal reorganization is under way with a view to initiating or boosting technical developments, so as to achieve a greater degree of consistency with the Framework Programme and the Programmes of Action. All in all, these activities will account for between 25 and 30 % of the JRC's work load.

#### 3.1. Application of remote-sensing technique to agriculture and the developing countries

In view of the fact that part of this topic now comes under the chapter on non-nuclear safety (II.1.2.1) and that the rest of the programme, applicable more particularly to agriculture and the developing countries, represents in its own right a work load which is at least equal to that of the entire previous programme, it is clearly apparent that research activities employing this particular technique are very much on the increase. This programme is the underlying factor in several important European projects involving a large number of national laboratories in the research activities of the JRC.

With the impending launch of more powerful observation satellites and as a result of growing interest in this new technology on the part of those

responsible for the Common Agriculture Policy and on the part of the developing countries, the JRC has been prompted to prepare new projects to ensure a rapid transition from the pilot-project stage to the point where pre-operational systems can be demonstrated.

3.1.1. In particular, with a view to evolving a European agricultural information network, the Commission is considering developing a model to depict the agricultural potential of the semi-arid regions of the European Community. Such a model would facilitate decisions on investment aimed at improving agricultural conditions (e.g., irrigation systems), interchanging of crops and introduction of a second crop (e.g., addition of olive plantations for the production of certain earlies), while at the same time helping to assess the cost-benefit ratio and to evaluate the associated problems (e.g., socio-economic).

3.1.2. As far as support to the developing countries is concerned, the JRC is proposing to extend its current activities in the Niger basin to take in a study of the hydrological dynamics governing agriculture and fisheries in this region. In keeping with the Commission proposal on ways of combating hunger (COM(82)320 Final), the JRC will study the harvest estimates for the Sahel and Sudan regions by drawing up hydrological data and, on the basis of these and other meteorological and earth-observation data, by building a forward-assessment model.

### 3.2. Support to industry : materials, measurement and standards

In the past the JRC has not played a prominent role in this field. The new proposal by the Commission is an indication of the latter's desire to encourage, instigate and promote applied research by the JRC and thus strengthen the level of technological achievement in the Community.

3.2.1. The field of reference materials and nuclear technology, which involves the production of these materials so vital to the nuclear industry and to safeguards, is one of the cornerstones on which the well established reputation and professional aptitude of the JRC's Geel establishment have been built. The same is true of the field of nuclear-constant measurements.

The Commission intends to capitalize on the experience acquired by the Central Office for Nuclear Measurements in this research and service sector. Accordingly, it is to consider extending the activities of this establishment to reference substance and methods in the non-nuclear field, as part of the CBR programme.

3.2.2. In the field of high-temperature materials the aim of the programme is to satisfy industrial needs as regards materials for long-term use in aggressive environments. The method chosen involves the promotion, coordination and execution of studies aimed at assessing the behaviour of materials in conditions applicable in the critical areas of important industrial processes. In this way the programme offers a scientific service by providing information on materials, by processing the data and by providing direct research programmes to help in the development of steels and alloys capable of withstanding the more stringent demands relating to corrosion, mechanical stresses, etc., as encountered in modern technological applications. The research will be extended to the field of ceramics, and a special effort will be devoted to the development of the information service for industry.

### 3.3. Renewable sources of energy and harnessing of energy

The JRC will concentrate its efforts on a more limited number of subjects (rational management of energy in the physical environment, testing and diagnostic techniques in the solar-energy sector), so as to increase the JRC's impact on the coordination of research by the Member States in these areas. Solar energy continues to be of primary topical concern, both as an export technology and as a contribution to the more general and pressing problem of energy conservation, notably in the physical environment and in undertakings in the agricultural - or agri-foodstuffs - sector.

- 3.3.1. The research on solar energy has led to the setting-up at Ispra of a central unit which tests solar equipment and specializes in the quality and service life of components. Apart from providing a service to industry, this test centre is the focal point for the national test laboratories when it comes to developing and comparing reference methods for checking performance, quality and service life. The emphasis will be placed on optimum industrial utilization of the test installations.
- 3.3.2. The "solar habitat" programme will gradually move into the more general context of the rational management of energy in the physical environment and the elaboration of energy-assessment methods, involving the rapid deployment by the Ispra establishment of teams and techniques capable of tackling the problem on a Community scale (studies of energy systems applied to pilot projects organized on a sector-by-sector basis).

### 3.4. Data-processing

Both rapid progress made in data-processing technologies and international competition are strongly reflected in the fields of microelectronics and computer software and all their ensuing applications, particularly in the field of communications.

JRC activities centre upon the "soft" aspects of the problem and, above all, communications.

3.4.1. In line with the Commission's other activities, the JRC has gradually shifted the centre of gravity of its data-processing research towards communication with databanks (common interrogation language), then the high-level protocols governing communication between computers on the commercial computerized telecommunications networks (the JRC manages the Test and Reference Centre for these EURONET protocols), and lastly the study of internal and high-speed networks (via satellite or optical fibres). There is a special emphasis on experiments involving the new applications of computerized telecommunications to office automation and communication in general (standards).

3.4.2. It should also be mentioned that data-processing research at the JRC is also being developed in two other fields, not under the heading of data processing research per se, but as part of the nuclear safety and remote sensing research programmes. The areas in question are artificial intelligence (expert systems and man/machine communication) and image-processing and shape recognition (remote sensing from space and monitoring of fissile materials management).

In a few year's time, the increased activities in these two areas could result in a JRC proposal to extend the research to the field of robotics where the Community is fairly well-placed as regards the micro-mechanics aspect, but somewhat behind in terms of "intelligent" robots.

#### 4. Other activities (around 10 % of the JRC total)

This heading covers two forms of activity which amount to service functions rather than research :

- exploitation of the high flux reactor (HFR) ;
- diffusion of knowledge ;

The Commission considers it important that the investments made in the various activities should be exploited for the benefit of the Community as a whole. What this amounts to is making the exploitation of a large irradiation plant as profitable as possible and increasing the means available for direct transfer of knowledge.

##### 4.1. Exploitation of the high flux reactor

The HFR at Petten is one of the four most powerful materials testing reactors (MTR) in the European Community. The simplicity of its design and use make it extremely reliable and suitable for a range of exceptional experiments.

The Commission has been at pains to make constant improvements to the installation in order to keep up with the latest technological developments. In recent years, the HFR has been operating fully-loaded.

This objective will no longer be covered by a complementary programme, but will be included in the joint programme.

The HFR will, in any case, be operated on a commercial basis, the irradiation tariffs and charges for services being adjusted periodically to ensure 100 % coverage of the operating costs for which the budget provides only pre-financing.

#### 4.2. Diffusion of knowledge

4.2.1. One means of directly transferring knowledge is short-term postgraduate-level training, focused on those disciplines and techniques especially developed at the JRC : in short, the Ispra Courses. The number of courses will be increased with a view to meeting the specific needs of countries linked with the Community through cooperation agreements.

4.2.2. Experience has shown that there is a case for integrating the formal machinery involved in taking out a patent, and for granting licences on JRC inventions. This could be done by developing and adapting the procedure to the specific requirements of the industry concerned, the impetus coming initially from the inventor-laboratory. It was for this reason that "exploitation" was included in the 1980-83 programme, a move that has been rewarded immediately with excellent results. Accordingly, the Commission proposes an increase in the small, but significant body of work being accomplished in this area.

5. The JRC as a host site for international large-scale installations and project teams

The Commission believes that consideration should be given to the possibility of the JRC establishment sites' playing host to large-scale international projects in fields covered by the Community's general research strategy or, more specifically, by the JRC itself : experience has shown that, in most cases, an international executive structure (joint venture, association, etc) is set up to administer large-scale research instruments which are subsequently housed at a national or international establishment, depending on the circumstances.

A similar formule would allow future facilities to be installed on a JRC site, particularly Ispra, which has considerable potential in this respect. It would then be possible :

- to make a profitable infrastructure out of one that is expensive at present because its costs are written off for a level of scientific activity well below the capacity of a site designed with highly ambitious programmes in mind;
- to give such projects the obvious benefit of assistance from JRC scientific and technical staff and specialist back-up services (Computer Centre, workshop, etc);
- to facilitate assimilation of the multinational staff brought together for projects, given the JRC arrangements (schooling, for example) whereby language and social problems have long been overcome.

The type of plant which could be considered are those with relevant applications to materials (mineral or organic) (ESRF)<sup>\*</sup> fusion (NET and IGNITOR) or the studies of the behaviour of structures under dynamic stresses (large vibrating table). In the long term, it is to be expected that the Community will choose a Community site, should it decide to build NET.

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(\*) European Synchrotron Radiation Facility. In view of the fact that Ispra has a large Materials section, the JRC would also be one of the major users.

The Commission has not had time to look into these possibilities in greater detail or to investigate others. In the case of IGNITOR , however, the Commission can now firmly state its intention to propose constituting an international project study team to be based at Ispra (see II.2).

### III. PART THREE - THE JRC'S RESOURCES

#### 1. The JRC's level of activity over the period 1984-87

The programme described in the preceding sections would use the same total resources in an average year as normal activities during an average year of the 1980-83 programme.

##### 1.1. The resources required amount to a staff of 2.260 and a budget of 174 million ECU at 1983 prices :

As the Commission stated in section 5(b) of its additional communication to the Council of 7 December 1982, the annual budget can be broken down as follows :

Average gross budget (see Annex I to the report of the Atomic Questions Group No 7614/1/82 Rev. 1, ATO 47, dated 16 June 1982) .....	167,5	MECUs
Average revenue from Italy .....	2	MECUs
Average revenue from the Federal Republic of Germany .....	1,5	MECUs
Increase in the average annual wage bill following the Court Judgment .....	3	MECUs
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Total	174	MECUs

1.2. The annual budget will be reappraised each year to take account of Council decisions adjusting salaries and economic fluctuations concerning other expenditure.

## 2. Revamping the infrastructures

The JRC's general and technical back-up services and infrastructures, whose status has deteriorated during preceding multiannual programmes, will be revamped during the period 1984-87 to a level commensurate with :

- a) the satisfactory execution of the research programme ;
- b) an improvement in the JRC's capacity to act as a host to international teams and large machines.

## 3. Staff rejuvenation and mobility

The Commission would draw attention to the measures designed to develop staff mobility and acquire new skills that it outlined in working paper SEC(83) 198, namely provision for a temporary excess workforce coupled with staff reduction measures to restore the staff complement to its average level of 2.260 by the end of 1985.

The exact details of the arrangements cannot of course be established before the basic policy decisions and the budget for the 1984-87 programme are known.

Mobility among researchers will also be sought through exchanges of staff between the JRC, laboratories in the Member States and industry; an increase in the flow of scientific visitors to the JRC and the number of trainees allocated to the Centre will form an integral part of the proposals for the period 1984-87.

## C O N C L U S I O N

The Commission would like the Council to approve at its forthcoming meeting, in the light of the tasks it intends to entrust to the JRC, the proposals for the latter's future activities put forward in this paper, it being understood that :

- the topics proposed are the result of a choice that is both in line with the Community's priority options and for the most part compatible with the JRC's capacity ;
- the relative importance given to the different project topics will be specified by the Commission when the latter presents the 1984-87 JRC programme, while the Council will have to plan its activities so as to take a formal decision on the 1984-87 programme by the end of November at the latest and at all events before the second reading of the 1984 budget ;
- improvements in the JRC's own decision-making process, which is the subject of a separate paper, will also be proposed for a decision in principle at the next Council meeting and a formal decision at the meeting in June ;
- the resources made available in 1983 will be used by the Commission as proposed in Annex A.

## ANNEX A

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### Use of the resources originally allocated to the Super-SARA project

#### 1. Staff

The Commission proposes :

- a) to assign immediately the staff of 90 corresponding to the Super-SARA project team to safety activities : 40 to work on reactor safety, 10 to fuel cycle safety and 40 to safety in the non-nuclear field ;
- b) to use the 57 additional posts already entered in the 1983 budget for the benefit of safety research, for which the Commission will request approval when this option has been adopted by the Council ;
- c) to use the staff gradually released from work on the ESSOR reactor to reinforce the technical back-up services and prepare the Ispra site to act as a host Centre for one or more scientific machines of interest to the Community (probably in the sphere of fusion).

#### 2. Funds

The funds that will be made available are those directly allocated to the Super-SARA project, which amount to 23.24 million ECU (status at the end of February 1983).

This amount is broken down as follows :

- |  |                   |
|--|-------------------|
| - appropriations specific to the draft 1983 budget :               | 2,19 million ECU  |
| - appropriations carried forward from the previous year :          | 3,88 million ECU  |
| - appropriations not yet committed for orders ready to be placed : | 17,27 million ECU |

.../...

The penalties for the termination of contracts, which should amount to some 2,0 million ECU at the most, should be deducted from this figure.

It is also possible to withdraw from a few more contracts, although there may be further payments to be made for services rendered, and the amounts that can be withdrawn are liable to be lower than the amounts that appear to be free.

On balance, a sum of approximately 21 million ECU may be put into reserve. The Commission proposes that it be used for the expenditure on the reversible decommissioning of the ESSOR reactor and for reinforcing certain nuclear safety activities in 1983.

## ANNEX B

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### Decommissioning the ESSOR reactor

1. The purpose of decommissioning is to bring the reactor into a condition which would make it possible, legally, to release the operating, safety and maintenance staff and to permit access, without controls or particular precautionary measures, to a part of the buildings and installations.
2. Various levels of decommissioning can be contemplated, ranging from merely unloading the special materials (fuel and heavy water) to completely dismantling it, which would permit a fresh use of the site. Each level of decommissioning assumes a specific cost, a relevant timescale and the appropriate possibilities of using the buildings afresh.
3. In 1982, a decommissioning project involving the complete dismantlement of the reactor and a large-scale decontamination operation which would make it possible, without the restrictions of radiological protection, to reuse most of the buildings of the ESSOR complex was devised, under the auspices of the Commission, on the basis of an initial report going back to 1978. This option would give rise to a decommissioning programme lasting four years at a total cost of 46,5 million ECU (including a margin of 15,5 million ECU).
4. In view of the need to release staff to execute its new programme, the Commission now proposes a different option which does not result in outright nuclear decommissioning but which, on the other hand, releases as quickly as possible most of the ESSOR reactor operating, safety and maintenance staff.

Under this option the decommissioning programme is reduced to two years and, from 1985 onwards, a large proportion of the staff could be re-assigned to the two alternative projects to Super-SARA proposed by the Commission, i.e., initially :

.../...

- a) a strengthening of the technical support services and the preparation of the Ispra Establishment to house one or more scientific devices of Community interest on its site and, secondly,
- b) the development of new projects concerning safety as a whole.

The cost of this decommissioning option is in the process of being estimated ; it should, in any case, come under the 1983 appropriations for the Super-SARA project.

5. The limited and reversible decommissioning option is characterized by the following guidelines :
- 5.1. unloading of the reactor core and the blocking of all means of access (cocooning) ;
  - 5.2. removal of the special material (fissile materials and heavy water) ;
  - 5.3. modification of the systems to ensure that the high-, medium- and low-activity laboratories of the ESSOR complex, which will carry on being used, can function independently ;
  - 5.4. searching in conjunction with the Italian safety authorities, for an optimum solution to the question of a nuclear operating permit which would allow both the caretaker staff to be reduced to the lowest possible level and a statute authorizing, as necessary, the performance of other nuclear experiments inside the ESSOR complex to be preserved. This option, which could effect several programmes, will be studied closely.

The present operating permit has an unspecified period of validity, but is subject to revision every five years; the next revision is due, precisely, in 1983.