

# COMMISSION OF THE EUROPEAN COMMUNITIES

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PROPOSAL  
FOR  
REVISION OF THE MULTI-ANNUAL  
RESEARCH PROGRAMME

(submitted to the Council by the Commission)

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INTRODUCTORY NOTE

A. PROGRAMMES FOR THE ISPRA, GEEL AND KARLSRUHE ESTABLISHMENTS

The programmes currently in progress have been reexamined in the light of:

- changes in research priorities in the Community;
- the experience of the first year's work on these programmes.

As regards research priorities in the Community, it is obvious that the energy crisis constitutes the most important new factor in the situation.

It is clear that political decisions, far exceeding the scope of the JRC and the role which it can play, will be taken by the Community in the course of the next few weeks or months. This being so, it may prove necessary to adapt the JRC's programmes accordingly.

In any event, it is reasonable in the meantime to promote closer alignment of the JRC's present work with the new requirements in the various fields of Community action.

As regards the experience of the first year's work on the four-year programme, it must be pointed out that, on the one hand, the extent of the changes embodied in this programme as compared with the activities carried out in the past and, on the other hand, the complexity of the problem of mobilizing the necessary skilled personnel are deterrents to any drastic modifications in this first programme revision.

All these considerations point to the advisability of proposing the following adjustments:

1. In the energy field:

- 1.1 The "nuclear" programmes, the size of which has been appreciably reduced in recent years, must be maintained, or even extended, the more so as their new orientation towards public service should dovetail with the considerable acceleration of industrial effort that is forecast. This is doubtless the case with

programmes such as safety studies, the technical support from Ispra for nuclear power plant operators and the programmes at the Geel and Karlsruhe establishments.

Some reinforcement of the "reactor safety" objective is proposed; this is prompted essentially by the present situation of the relevant programme (Annex I) and by the opinions of the corresponding Advisory Committee on Programme Management (CCMGP).

As regards technical support for nuclear power plant operators, although it is easy to foresee that the marked speeding-up in the construction of nuclear power plants will cause operators quite appreciable technical problems, it is proposed that the programme be maintained at its current level, since it is not yet forging ahead to the extent originally planned.

1.2 In the new energy supply context, the importance of the programme on hydrogen production by decomposition of water through chemical cycles stands out clearly. While an increase in the size of this programme at the Ispra establishment is considered to be a possibility, it seems more appropriate at the present time to give priority to the participation of other laboratories and of industry (Annex II) by means of contracts.

1.3 The recent programme on the use of solar energy (under the "new technologies" heading) is logically more justified, and therefore of greater priority, in the new context of the energy crisis. Consideration has accordingly been given to reinforcing this programme, so as to achieve an effective level of activity, and to improving the design of the experimental programmes.

However, before tabling a formal proposal, the Commission wishes to hear the opinions of experts in the fields involved.

1.4 In line with the proposals in the field of thermonuclear fusion which have already been put forward by the JRC and acted on by the

Council, and with the recommendations of the Associations' liaison committee, it is proposed that the JRC should participate in the joint effort on system feasibility studies (Annex III).

2. As regards the other aspects of the diversification of the JRC's activities, the only changes proposed are as follows:

- 2.1 In respect of the remote sensing of the earth's resources programme, the results already obtained and the prospects held out are such as to justify proposing an increase in the resources allocated (Annex IV).
- 2.2 Where the recycling of raw materials programme (under the "new technologies" heading is concerned, it seems to be preferable for the moment, bearing in mind the role that industry will be called upon to play in this field, to develop the evaluation studies in depth before undertaking laboratory work while maintaining the current level of activity.
- 2.3 As regards the training programme, it is important that the development of the Ispra establishment as a scientific meeting-place (on the European and international levels) should be continued. As a follow-up to the initiative on post-university training courses, it is planned to study the possibility of creating a department for the organization of summer courses. This study will take several months, in view of the variety of problems involved (Annex V); the results will be embodied in a detailed proposal. In the meantime, there are plans, at an organization level, for a summer course to be held in 1975 which would make use of the Establishment's scientific personnel. The relevant infrastructure would require the spending of an estimated 70 000 u.a.

With a view to avoiding an increase in the staff authorized for each of the three Establishments at Ispra, Geel and Karlsruhe, a critical examination of all the programmes currently in hand has been carried out in order to identify the activities which can be cut down or abandoned, so as to make possible the adjustments outlined above. In addition to the cases already mentioned, the following

measures are envisaged:

1. The maintenance in operation of the ESSOR reactor on the Ispra site makes it possible to give active consideration to shutting down the Ispra-1 reactor. Annex VI shows the actions to be undertaken to ensure continuity in the activation analysis work and in the operation of the EURACOS neutron converter.
2. The waste treatment and storage programme needs to be reexamined, in spite of the fact that this problem is likely to become even more important. Annex VII contains the main features of this programme, the conclusion from which is a proposal to reduce the number of staff.

**B. PROGRAMME FOR THE PETTEN ESTABLISHMENT**

It is proposed in respect of the new programme for the Petten establishment that the proposal as set out in the JRC document be maintained despite the reservation expressed by the General Consultative Committee. The action entitled "Administration of the Customs Union" represents a genuine need on the part of the Commission, especially since the activities planned could extend to the removal of technical barriers. In this particular field, therefore, the JRC could make a most valuable contribution to the work of the competent departments of the Commission. The second part of the programme envisaged for Petten concerns carbon technology and chemistry, a field in which the Petten establishment possesses the necessary equipment and experience.

The overall situation of the four Establishment's programmes before and after the proposed revision is set out in Annex IX.

C. OVERALL ASPECTS AND FINANCIAL PROBLEMS

When the financial implications of the multiannual programme proposals were worked out, an average cost-of-living increase of 6% per annum was assumed in view of the pay increases to be decided upon by the Council. It will therefore not be possible to keep within the overall ceiling for the cost of the four-year programmes for ISPRA, Geel and Karlsruhe without the creation of a suitable financial reserve designed to cover foreseeable increases in the years ahead.

In 1973, an agreement was reached with the Council on a provisional solution, in order to avoid this problem being raised during the discussion of the first budget, and all discussion on the principles involved was deferred until the revision proposals were examined.

In the meantime, it was decided by the Director-General of the JRC, in order to reduce the financial deficit as far as possible, to keep the JRC below establishment, in particular by deferring recruitment of nationals from the new Member States. Such a measure, which was, moreover, almost inevitable owing to the delay in the Council decision on the new staff regulations of officials and other servants of the JRC, nevertheless cannot be pursued because it is incompatible with sound administration and optimum execution of the programmes.

In the light of (a) the fact that in 1973 salary increases and other unforeseen expenditure were absorbed within the budget adopted by the Council (but will have certain repercussions on subsequent financial years), and (b) the hypothesis that at the end of 1974 staff will again be at the level laid down by the Council, a new overall programme expenditure timetable has been evolved (Annex X) on the basis of the initial appropriations and taking account of new activities (fusion reactors). This is supplemented by the forecasts for expenditure relating to the new activities of the Petten establishment, estimated at approximately 4 750 million u.a. for the period 1974-76, and the setting-up of a reserve fund of 21.2 million u.a. for absorbing increases in salary and wage costs (on the assumption that these will rise at an annual rate of 10%).

Only one indirect-action programme is proposed for revision, namely, "Protection of the environment". This proposal covers neither the content of the programme nor the budget for it, but an increase in the staff to manage it.

The Commission proposes that the whole of this revision should be operative from 1 July 1974.

D. CONCLUSIONS

Annex XI contains an overall summary of the new breakdown of staff among the various objectives of the JRC's programme as a result of the revision proposals contained in Annex IX. In addition this Annex shows the breakdown by objectives of the 108 Establishment staff whom the Commission proposed recruiting in consequence of the new Italian regulations on service contracts.

In conclusion the Council is requested to:

- approve the proposals on the revision of the JRC's programme, together with the relevant draft decisions;
- approve the proposal for a revision of the programme of indirect action entitled "Protection of the environment", together with the relevant draft decision;
- approve the proposal for the creation of a budget reserve, together with the relevant draft decision;
- approve the recruitment of 108 Establishment staff, together with the relevant draft Council Decision.



A. PROPOSAL

FOR THE REVISION OF THE JRC MULTIANNUL PROGRAMME

AND FOR A NEW PROGRAMME FOR THE PETTEN ESTABLISHMENT

APRIL 1974

A N N E X I

REVISION OF THE SAFETY PROGRAMME

The research programme in support of reactor safety was originally (1969) linked with the JRC's activities as regards the development of reactor concepts. In the intervening years the main demands on the JRC from European organizations requiring safety R&D have been predominantly in the experimental field. This bias towards the experimental side has been propitious in the sense that Ispra now has highly qualified staff in the experimental disciplines, and this has ensured satisfactory execution of the work and a growing volume of activities carried out in collaboration with external bodies.

Examples of major activities in the 1974 safety programme which have developed in this way are the experimental model studies of hypothetical explosive accidents in fast reactors (strongly supported for many years by the DeBeNeLux-SNR and CNEN-PEC projects) and the large mock-up rig for the simulation of light-water-reactor LOCA<sup>1</sup> (initiated by a contract with the BMFT<sup>2</sup>, signed in December 1973). A summary of all activities proposed for 1974 is given in Table 1, in which these two particular examples figure as actions 1.1 and 2.2 respectively. It may be noted in passing that the Community manpower allocated to the LOCA mock-up project (2.2) is backed by a further 10 men/year, paid under the BMFT contract and not mentioned in Table 1.

Table 1 demonstrates clearly the abovementioned bias towards the experimental aspects of reactor safety. It will be noted that, out of the total manpower of 115 men/year, only 7 men/year (6% of the total) are available for theoretical studies. Although justified in the past, this bias is now felt to be inappropriate for the tasks ahead. Above all, we consider that a stronger theoretical support

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<sup>1</sup>Loss-of-coolant accident.

<sup>2</sup>Bundesministerium für Forschung und Technologie.

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is essential for the scientific success of the experimental programmes, particularly those already cited: DBA modelling (1.1) and the LOCA project (2.2). The need for such theoretical support is basic and independent of the detailed composition of the future experimental programmes. In addition to this basic internal need of the safety programme, there are pronounced external trends which call for an increased theoretical effort. In the forefront of these trends is the need for coordinated European effort in the field of "whole-core accident codes" for the assessment of fast reactor accident evolution. The "Safety Working Party" of the Coordinating Committee on Fast Reactors has set up an expert panel for this purpose and Ispra has been requested in this body's official report to play a central role in its activities.

These facts suggest strongly that the manpower available for all the activities in Chapter 5 of the programme (Table 1) must be appreciably increased. We have estimated that the manpower required for the activities visualized in the field of theoretical accident analysis should be at least 14 men/year (instead of the currently available 7 men/year) with a breakdown roughly as follows:

5.1 DBA modelling theory	4.5 m/y
5.2 LOCA theory and codes	4 m/y
5.3 Core accident codes	5.5 m/y

This proposal has been given strong backing by the new Advisory Committee on Programme Management (Safety). The creation of this Committee has greatly eased the task of directing safety research at Ispra in that it brings together at regular intervals, safety experts from such major national organizations as licensing and safety assessment authorities, utilities, industries and research centres.

The official opinion of this Committee explicitly recommends "an intensification and expansion of the work directed towards... the development and testing of analytical methods for safety assessment". On LOCA theory and codes, the Committee "considers that this work

TABLE 1

## SUMMARY OF THE 1974 SAFETY-ORIENTED RESEARCH PROGRAMME

CHAPTER	ACTIONS	1st line pers PRES
1. Engineering research associated with accidents or their prevention	1.1 DPA modelling, experiment	7.7
	1.2 Stress/strain/strain-rate measurements for steels	4.3
	1.3 Thermophysical properties of core melts	3.5
	1.4 Fracture mechanics: fracture control in fast reactor structures	6
2. Coolant thermohydraulics studies associated with accidents	2.1 Basic loss-of-coolant studies; thermodynamic non-equilibrium studies	18.5
	2.2 Loss-of-coolant loop project; influence of PWR loops on loss of coolant	
	2.3 Transient boiling heat transfer in ECC conditions	6
	2.4 Mixing of coolant in fuel bundles under conditions of boiling	
	2.5 Basic studies on burnout in fuel-rod bundles	6
	2.6 Fuel/water thermal interaction, in-vessel experiment	2
	2.7 Fuel/sodium thermal interaction, in-vessel experiment	5
	2.8 $UO_2/Na$ and $UO_2/H_2O$ thermal interaction, in-channel experiment	3
	2.9 Na boiling thermohydraulics, basic studies	5
	2.10 Gas behaviour in Na loops. Liquid film characteristics	6
	2.11 Sodium thermohydraulics in rod bundles (design and tests)	3.5
	2.12 Basic analysis of rod-bundle thermohydraulics	4
	2.13 Basic sodium boiling studies	4
3. Early failure detection	3.1 Ultrasonic emission	4.5
	3.2 Neutron noise investigations	1.5
	3.3 Thermohydraulic noise analysis	4
4. Reliability	4.1 System Reliability	3
	4.2 Structural Reliability	4
	4.3 Data acquisition and processing	1.5
5. Theoretical accident analysis	5.1 DPA modelling theory	2
	5.2 Loss-of-coolant theory and codes	2
	5.3 Core-accident codes	3

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is an ideal field of activity for the JRC and recommends a substantial increase in the manpower allocated to it" and on core accidents codes "the Committee considers that the area of activity should be enlarged to include broader accident analysis in the fast reactor field and... draws attention to the activities of the Safety Working Party of the Coordinating Committee on Fast Reactors and especially its offspring, the expert group on whole-core accident codes".

It is accordingly necessary to carry out a revision of the safety programme in which the cooperation of seven additional theoretical specialists will be required, bringing the manpower ceiling from 115 up to 122 men/year.

Proposed allocations for first year

1st line personnel:	122 m/y
primary budget:	680 000 u.a.
computer calculations:	290 h

The primary appropriations envisaged cover all requirements for the financial year 1974, since the increase in the manpower ceiling (from 115 to 122 "first-line" personnel) will not take effect until 1 July 1974.

A N N E X I I

REVISION OF THE HYDROGEN PRODUCTION PROGRAMMEIntroduction

The study of a new industrial process for hydrogen production from water, as a possibility for wider use of nuclear energy, is in the research phase. The task of the JRC in this phase is:

- to explore the possibilities of finding new chemical cycles for disassociation of water;
- to define their specific characteristics and to test their feasibility by experimental work.

The research phase must be concluded in three or four years with the preparation of a dossier containing information and data (probably on several cycles) sufficient to design a pilot plant and to make fairly detailed technical and economic evaluations.

The activities performed at Ispra during 1973 in connection with the abovementioned task yielded various significant results, i.e.:

- (a) Concerning the search for new cycles, two possible "families", quite different from the chemical-cycle families already known, were defined and are now being studied for preliminary verification; the experimental tests are not yet sufficiently advanced for a patent application to be made. Amongst these new ideas, there are some cycles based on iodine, sulphur, oxygen and others based on an organic compound, namely ethylene. The most recent tests, for exploring possibilities for variants of the Mark 1 cycle, have not given worth-while results for Mark 1C and Mark 1S, which use copper and strontium respectively. As regards other cycles, no experimental tests were conducted, and for various reasons: some difficulties in carrying out the experiments; less promising characteristics, the requirement to keep the overall effort within reasonable limits.



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- (b) Concerning the more detailed studies for obtaining additional information on some selected cycles, work performed during 1973 concentrated on the hydrolysis reaction of the Mark 1 cycle (and such related problems as physical property measurements) and on the reactions of the iron-chlorine family. Kinetics data were obtained, together with information useful for carrying out chemical reactions in steady-state conditions.

Corrosion tests for preliminary screening of materials resistant to hydrobromic acid and various bromides were completed (temperature from 126°C to 800°C, various concentrations, time up to 5 000 hours); tests with hydrochloric acid were started.

The computer programme OPTIMO was prepared, for the determination and optimization of the flow-sheets from the point of view of thermal efficiency and internal heat recovery. The programme has already been applied to calculations for the Mark 7 and the Mark 9 cycles. The latter cycle may be particularly promising, since its maximum temperature is only 650°C and it uses iron and chlorine as chemical elements.

If account is also taken of the situation of the other laboratories at present involved in these studies, the development of the research has probably reached the critical point at which some important decisions will have to be made in the near future. There are two important facts to be considered:

- (a) on the one hand, the present phase is one of considerable increase in the number of cycles; as a consequence, we have interesting differentiation in the characteristics of the various chemical processes and also wide range of choice. We foresee that in the near future exploration of the various possibilities will have advanced sufficiently to afford us a reasonable understanding of the potential of this new method;

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(b) on the other hand, the information already obtained regarding some of the chemical cycles is sufficient for making technical economic evaluations which, although preliminary, are nevertheless necessary. The same procedure will have to be followed for selecting the most promising process before launching more expensive projects.

From the foregoing we can draw some conclusions for the near future:

1. The laboratory tests involved in the search for new cycles and for the study of various critical reactions continue so that full information can be obtained as to the possibilities offered by these chemical cycles.
2. These studies will be followed by a widening of the programme of kinetics measurements, and in some cases by the experimental performance of complete bench-scale cycles.
3. The transition from Phase 1 to Phase 2 of the abovementioned experimental work must be preceded by feasibility studies and technical and economic evaluation of all the cycles already determined.

Work on Phase 1 is in progress at Ispra and is within the capacity of the research laboratories. For 1974 the effort may be maintained at the same level as in 1973, except for a few minor adjustments.

The work involved will require the contribution of some industrial experience; in order to obtain rapid practical results, it would be useful to bring industrial companies directly into these operations. The starting-point for Phase 2 will probably be in 1975, depending on results of the evaluations which are to form Phase 3.

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The Phase 3 work consists in a study on feasibility evaluation and economic calculation, based essentially on industrial skills. It can start immediately, using the available data in order to gain in one year sufficient information to orient the costly tests in Phase 2. It may prove possible to shorten the time scale, depending on the interest in these new processes shown by industry all over the world. During recent months industrial companies in the USA and Japan have embarked on experimental programmes on thermochemical production of hydrogen from water and will have the results before very long.

In order to maintain its lead in this field, the European Community should speed up the process of transition to industrial application by enlisting the cooperation of industry so as to by-pass bench-scale operations.

Proposed programme

In the light of what can be anticipated from the foregoing considerations, the programme proposed for 1974 is based on the following two points:

- laboratory work at JRC maintained substantially at the same level as in 1973;
- increased participation by industry, having regard to the specific skills on hand and the advantage to be gained by reducing the time factor. This direct involvement of industrial experience could take the practical form of contracts, for instance. The subject of the research is well suited to the characteristics of common European action.

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Proposed allocations for first year

1st line personnel	37 m/y
primary budget:	153,000 u.a. + 200,000 u.a.*
computer calculations:	20 h

The primary budgets adopted cover all requirements for 1974.

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\*Amount envisaged for contracts.

A N N E X I I I

ANNEX IIITHE FUSION REACTORS PROGRAMMEIntroduction

The interesting prospects opened up by controlled thermonuclear fusion as a means of long-term energy production are a powerful stimulus to research and development in this area.

At the present time, controlled thermonuclear fusion programmes in the various parts of the world and, particularly in the Community, are directed to securing an understanding of the ionized state of matter (plasma). Investigations into the feasibility problems relating to fusion power reactors have been initiated.

During 1970-72, an analysis was effected of the knowhow in the JRC on the basic problems of fusion reactors. From this study it emerged that a major contribution could be made to the solution of a number of these problems. A first programme proposal was formulated and technical discussion of it took place as part of the preparatory work on a JRC multiannual programme.

In April 1973 this proposal was submitted for an opinion to the Liaison Group of EEC Fusion Associations. At the end of this Annex will be found the text of the recommendation made by the Liaison Group at its meeting on 12-13 December 1973.

CONCEPTUAL STUDIES AND RELATED FEASIBILITY EXPERIMENTS

The JRC has a number of calculation methods and also design knowhow for studies of this type, in particular:

- nuclear data banks and methods for calculating the breeding ratio, neutron and gamma energy deposition in blanket and shielding, radiation effects (e.g., displaced atoms and helium production rates). A modular code system for nuclear data calculation is already in operation;

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- thermohydraulics and stress analysis codes to deal with up to three-dimension geometry problems. These codes are based on the "finite elements" method and are therefore highly flexible;
- design of modular structures for high-temperature applications;
- codes for the analysis of fast transients in complex geometries, in both one- and two-dimension approximation.

This experience is being used to underpin the efforts of the study groups set up within the laboratories comprised in the Community "Fusion" Associations.

MAGNETIC CONFINEMENT SYSTEM STUDIES

Arrangements have been made for a cooperation agreement with the Euratom-CNEN Association, Frascati, for the study of an experimental fusion reactor project to be used for the construction of a full-scale prototype reactor of the TOKAMAK type. This reactor will have the maximum dimensions compatible with the plasma energy balance criteria and will use thoroughly familiar materials and reactor technology.

The main suggestions are as follows:

- the blanket should be arranged in a modular form, the modules being of as few types as possible and few in number;
- the type of cooling should be the same as that planned for the commercial reactor in order to simulate the engineering problems involved in the blanket structure. Helium is the preferred coolant;
- owing to the fact that we do not have much experience with irradiation of refractory materials, stainless steel has been chosen as the structural material, because it will probably have been fully tested in fast breeder (fission) reactors by the time the demonstration fusion reactor has been constructed. However, the blanket should be designed in such a way that tests on new materials of interest to commercial power stations are possible.

ANNEX III

The abovementioned modular arrangement will be adopted in order to satisfy this requirement.

The specific JRC work will proceed along the following lines:

- optimization, from the tritium-breeding and heat-transfer points of view, of the blanket design;
- comprehensive studies of the possible shielding materials and projects for obtaining reasonable neutron fluence and gamma deposition in the superconducting magnet;
- alternative study of a reactor-operating mode in which the lithium-breeding blanket is replaced by a non-breeding blanket;
- study of the effects of changes in the reactor operating conditions. The technological implications of changes in the plasma parameters proposed by the Study Group will be analysed with a view to assessing the flexibility of the project and the reactor's operating potential under various plasma conditions;
- analysis of the radiological hazards associated with the use of stainless steel, from the point of view of both operation and waste disposal.

During these studies, improvement of the calculation models and certain nuclear data will be necessary. The following points will be analysed in particular:

- analysis of the high-energy gamma-production cross-section data in accordance with the recent evaluations and retrieval codes (LAPHAN series) and KERMA factor models;
- optimization of the number of energy groups for the neutron and gamma transport calculations; comparison between the SN type and the diffusion codes (e.g., SABINE) for calculating the magnetic shielding;



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- adaptation of the calculation models for thermohydraulic and stress analyses (FLHE and BERSAFE codes) in order to deal correctly with the modular geometry of the fertile blanket and of the shielding;
- study of data on the compatibility between lithium and stainless steel. A restricted experimental programme could be considered in this field in order to test the corrosion of stainless steel by lithium at temperatures up to and exceeding 500°C.

INERTIAL CONFINEMENT SYSTEM STUDIES

Agreement has been reached on collaboration with the Euratom-IPP (Garching) Association for a conceptual design study on power reactors with inertial confinement and laser ignition.

This initiative must be considered to form part of the system studies on the various types of fusion reactors under construction in the laboratories comprised in the Community "Fusion" Associations.

The conceptual design studies will deal with the following areas:

- dense plasma lifetime history;
- pellet production and injection;
- laser and beam guiding;
- containment;
- heat recovery and removal;
- energy conversion.

The study will be directed to investigating the features of a module of a 200-500 MW(th) power reactor system comprising a single explosion chamber.

The JRC (Ispra) contribution will cover the following aspects:

ANNEX III

- Explosion containment. A number of solutions are being envisaged, based on both a "dry" or "wetted" wall concept. In all of them, the main phenomena to be investigated are characterized by evaporation and suppression of the matter on the wall surface. A fluidynamic calculation method supplied by Garching, including as input the time- and space-dependent energy release by nuclear energy burn, will be developed. The code will deal with the effect of X-rays and charged particles and will make it possible to determine the vaporization conditions of the wall for different cavity radia and wall materials.
- The heat-transference effects in the blanket, due to the repeated neutron energy release will be studied with unidimensional and bidimensional codes already developed at Ispra in connection with the fast breeder reactor containment studies. In the fusion-by-laser case, the input will be the temperature distribution resulting from the energy deposition.
- For the nuclear calculations (tritium breeding, energy deposition by neutrons and gamma rays, shielding, radiation damage, etc.) the same modular calculation scheme already referred to in the case of magnetic confinement systems will be used. As regards thermohydraulics codes, extension to time-dependent problems will be considered.
- A first assessment of the reactor-module layout will be considered in order to identify the engineering problems, from operation and maintenance standpoints, and then indicate the future lines of investigation for this type of reactor.

An experiment simulating the heat-transference effects of a micro-explosion on the containment is planned as a back-up to these studies. It would appear from an initial appraisal that the energy released by flying pellet debris and the internal energy for a typical 100 mJ

ANNEX III

reactor micro-explosion should be simulated with a wire explosion system having an energy of 10 kJ. In view of the fact that the explosion which we intend to simulate is the melting of a D-T pellet, the lithium or Li-D wires would seem to be well suited to the purpose. There is already a wire-explosion device for energies up to 15 kJ at Ispra.

Organization

As already agreed, the JRC will collaborate with the study groups on reactor design. In order that this collaboration remains closely linked with other work on fusion reactor technology in the Community, the general technical supervision of the work would have to be the responsibility of the Commission as part of its fusion programme.

Written reports would have to be submitted each year to the Fusion Liaison Group, which would have to be consulted on any revision of the programme. Should a Consultative Committee on Programmes be required, the task would devolve on one of the existing organizations under the Community's fusion programme.

Proposed allocations for the first year

1st line personnel:	12 m/y
primary budget:	23 000 u.a. + 20 000 u.a.*
computer calculations:	100 h

Since the action would have to begin on 1 July 1974, the requirements have been calculated accordingly.

The first-line personnel comprises five university graduates, which is commensurate with the volume of activity envisaged by the Liaison Group on Fusion.

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\* Amount envisaged for the contracts.

ANNEX III

Recommendation of the Liaison Group on "Fusion"

"Proposal for a programme on fusion technology put forward by the JRC, Ispra.

After examining the report and the recommendations of the Advisory Group on Reactor Technology, the Liaison Group noted at its 20th meeting (held in Brussels on 12-13 December 1973) that all of the work carried out by the JCR, Ispra, and in particular the reactor design studies and theoretical and experimental work, was very useful for the fusion programme.

The Liaison Group requires clarification of what was carried out under the 1973 programme in respect of the basic studies on the plasma/wall interaction and on the first-wall materials before being able to issue a final recommendation. It must be pointed out once again in this connection that this work would have to be carried out in close collaboration with an Association.

As regards data processing, the Liaison Group has expressed the wish that the JRC, Ispra, should contact the Coordinating Committee on Fusion in connection with data acquisition systems."

A N N E X I V

ANNEX IVREVISION OF THE REMOTE-SENSING PROGRAMMEIntroduction

The programme adopted by the Council of Ministers in February 1973 was based mainly on the availability at the end of 1973 of the US satellite ERTS-B to perform agricultural research at selected test sites in Northern Italy, Southern France and Madagascar. To obtain the data collected by the satellite during its orbits above the sites in question, a research proposal was submitted to the NASA\* in February 1973. Owing to unexpected delays in the launching of ERTS-B, various images collected by ERTS-B have been made available to the JRC but in a random and unreliable manner. These images have nevertheless enabled the research staff to demonstrate in one case, after only one year of preparation, the validity of the method selected.

The programme which was proposed required a very small number of research scientists and technicians (4 men/year for the first-line personnel) and a modest budget (20,000 u.a.). In view of the JRC's lack of experience in this completely new field of research, it was considered in 1972 that a great deal of caution was necessary and that more ambitious aims should be delayed until sufficient knowhow had been obtained. Now that two physicists have had intensive training in the USA (NASA, Purdue University, Michigan University) and the experience has been accumulated over a year of substantial efforts, there can be no doubt that the JRC remote-sensing research staff has surmounted the first hurdle.

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\*Agricultural research in Northern Italy and Southern France (Agreste Project). NASA Proposal No 28790 in collaboration with the Directorates-General for Agriculture, Development and Cooperation, and Industrial and Technological Affairs, Statistical Office of the European Communities and various specialized national institutes.

ANNEX IV

It is now unlikely that ERTS-B will be launched before the end of 1974. Although this delay means changing the initial planning, a large part of the 1974 programme will be executed by substituting satellite flights for aircraft balloon flights.

It is to be expected that, compared with the initial planning, some activities will be anticipated and others delayed until ERTS-B is in orbit. In addition, the apportionment of tasks will be somewhat changed, but it is considered fundamental to obtain clear, decisive numerical results in 1974.

The revision of the proposed remote-sensing programme thus satisfies the following requirements:

- (a) the increase in manpower results from the fact that the research staff numbers are no longer sufficient for proper performance of all the tasks assigned to it;
- (b) the increase in research budget results from two essential requirements:
  - to replace the data which was to be furnished by ERTS-B (in exchange for the JRC results) by aircraft or balloon data, in order to obtain decisive results in 1974;
  - to conclude a contract for pre-processing methods, as the NASA pre-processing facilities associated with ERTS will not be available for aircraft/balloon flights.

The year 1973 was devoted mainly to the definition of methodologies to be applied to ERTS-data processing:

- Ground-truth instrumentation.
- Survey preliminary to ground-truth research in rice-fields, lysimeters, poplar plantations and beech-forests.
- Determination of rice spectral signatures.
- Atmospheric transfer corrections.

ANNEX IV

- Analogue processing of preliminary aircraft/balloon flights (two-channel multispectral scanning radiometer).
- Thermographic measurements on rice diseases.
- Development of software techniques for data processing.
- Microdensitometric processing of ERTS-A data on Italian rice-fields in a specific part of one of the test sites: inventory (data obtained from NASA in May 1973).

The results will be published in an invited paper to the ESRO European ERTS-Users Symposium in Frascati (January 1973) and to the 9th International Remote-Sensing Symposium in Michigan (April 1973).

Proposed programme

The criteria employed for the formulation of this proposal are:

- obtaining practical results in order to demonstrate the feasibility of the initial objectives;
- permitting easy transition between studies for which aircraft or balloon flights are used and those for which satellite flights are used;
- improving the preparatory work on ERTS-B data-processing, and hence securing greater efficiency.

Activity in 1974 will consist of:

- Systematic analysis of physiological and morphological parameters in lysimeters and in the field.
- Study of biomass-production ratios.
- Study of disease-detection parameters.
- Continuation of the finalization of atmospheric corrections and atmospheric transfer models.
- Study of bioclimatological parameters.
- Programme of correlated measurements between ground platforms (cherry-picker) and an advanced airborne multispectral scanner facility.



ANNEX IV

This programme is aimed at unambiguous identification of the vegetation species covered by the Agreste project.

- Digital data-processing for subject mapping (using existing classification software processes adapted or devised at the JRC).

Proposed allocations

1st-line personnel:	8 m/y
primary budget:	33,000 u.a. + 20,000 u.a.*
computer calculations:	200 h

\*The primary appropriations envisaged cover all requirements for the 1974 accounting period, since the increase in staff (from 4 to 8 first-line personnel) will not take effect until 1 July 1974.

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\*Amount scheduled for contracts.



ANNEX VTRAINING

The "Training" programme is new and started officially in May 1973. This Annex gives a summary on "Activities in 1973", "Activities planned for 1974" and an "Extension of Activities". The activities planned for 1974 will enable valuable experience to be gained for assessing the possibilities of adding to the Ispra Establishment a European meeting-place. As an extension of and in line with the present activities it is proposed that a detailed study be undertaken of the establishment of an institution to be known as "European Summer Schools". This institution will organize, in collaboration with industrial and scientific personnel from the various member countries or with European societies, e.g., European Physical Society, summer courses on an international scale.

I. Activities in 1973

The main tasks performed during the year were:

- the preparation of a series of courses on "Nuclear Materials Safeguards" for new inspectors in the Safeguards Directorate (Luxembourg) of the European Commission and:
- the preparation of "ISPRA Courses" on technical and scientific subjects, for the benefit of any interested organizations in the European Community.

1. Series of courses on "Nuclear Materials Safeguards"

The series was for the most part prepared by the lecturers at the JRC, Ispra, the Safeguards Directorate and four invited lecturers. The preparation of the courses was completed in October 1973.

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The series consists of four one-week courses.

- (1) Nuclear fuel cycle and nuclear materials safeguards systems.
- (2) Physics, health physics and statistical methods.
- (3) Non-destructive testing in the field of nuclear materials safeguards.
- (4) Chemical testing and sealing; Identification techniques in the field of nuclear materials safeguards.

The first two courses will be held in Luxembourg, with the participation of member of the Safeguards Directorate staff as lecturers and of invited lecturers from ALKEM (Germany), ENEL (Italy), EUROCHEMIC (Belgium) and NUKEM (Germany). The last two courses will be held at Ispra, with the participation of members of the Chemistry, Material, CETIS, Nuclear Studies and Health Physics Divisions.

2. "ISPRA Courses"

A survey was made of the fields in which the scientific and technical personnel have acquired sufficient skills to organize training courses and to offer them to potentially interested organizations. The survey showed that, in the light of professional skills, 16 courses with a total duration of 22 weeks can be prepared. With the exception of three of the courses, coordinators have been appointed and work has started on preparation of the subject-matter of the lectures.

II. Activities planned for 1974

The activities planned for 1974 are:

1. Series of courses on "Nuclear Materials Safeguards"

The "Nuclear fuel cycle and nuclear materials safeguards" and the "Physics, health physics and statistical methods" courses will be held in Luxembourg from 4 to 15 February and the "Non-destructive testing" and "Chemical testing and sealing; Identification techniques" courses at Ispra from 25 March to 5 April 1974.

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2. "ISPRA Courses" - 1974

Preparation of the subject-matter of the ISPRA Courses will continue, with the aim of holding the first courses at the end of 1974.

One of the main tasks is the creation of the required infrastructure:

- the construction of a lecture hall, and
- the setting-up of an efficient secretariat with the necessary technical resources.

3. 1975 Summer School at Ispra

A summer school in physics during the autumn of 1975 is being considered.

III. Extension of "Training" activities

Activities in this field will be extended by:

- a study on the "European Summer Schools" proposal.

This proposal would call for the setting-up of an appropriate scientific and administrative secretariat and the availability of the required facilities: lecture halls and hotel accommodation for the participants and sufficient funds, the aim being to organize summer schools on an international scale in collaboration with industrial and scientific associations, both national and European.

It is planned to prepare the final decision in five steps:

- (1) Analysis of the situation in Europe.
- (2) Definition of the goal and scope of the "European Summer Schools".
- (3) Assessment of the various possibilities.
- (4) Reconsideration and, if appropriate, redefinition of the aims and scope of the "European Summer Schools" in the light of the results obtained.
- (5) Preparation of a specific proposal.

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Preliminary outline of the problems to be examined in connection with the proposal for "European Summer Schools"

(1) Analysis of the situation in Europe

- List of existing national institutions with the same purpose, e.g., Erice (Italy), Varenna (Italy), Oberwolfach (Germany).
- Their budget and particulars of the sponsoring organization.
- For each institution: list of fields and list of industrial or professional societies or groups organizing summer schools at these institutions.

Additional information required:

- Method of operation and use of the facilities and infrastructure of these institutions;
- Degree of utilization of these institutions:
  - number of summer schools per year;
  - period of the year during which such courses are held;
  - duration of the summer schools.
- Participation in the summer schools:
  - total number of participants in a year;
  - minimum, maximum and average number of participants in a course;
  - breakdown of participants and lecturers by nationality;
  - breakdown of languages used for lectures.

(2) Definition of the aim and the scope of the "European Summer Schools"

Principal decisions:

- Definition of the aim:
  - summer schools in fields for which there is a certain skill at Ispra, or
  - also in other fields, with the cooperation of industrial or professional groups or societies in the member countries?

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- Accommodation infrastructures:

- Use of Club House with additional buildings possible? or
- Contract with "Hotel Europa", Ispra, or the "ISTUD", Varese? or
- Construction of new facilities?

(3) Evaluation of the possibilities

The evaluation will require the answering of questions such as:

- Statement of interest by potentially interested industrial or professional groups or societies in the Member States to organize, in collaboration with the Organization, European Summer Schools on a European or international scale?
- Degree of competition with national organizations which to a major extent already organize their summer schools on an international scale?

Cost estimate for the 1975 Summer Schools

A. Basis of the estimate

- A summer school lasting two weeks with a teaching staff of about 14 lecturers (8 from Europe and 6 from the United States) and between 50 and 70 participants.

B. Cost estimate (in u.a.)

1. Expenses for lecturers .....	15,000
- travel expenses .....	5,000
- daily allowances .....	5,000
- fee .....	5,000
2. Grants for students .....	15,000
- 30 travel grants (Europe) .....	5,000
- 30 grants for 12 daily allowances .	10,000
3. Expenses for the proceedings .....	token entry
	<hr/>
Total:	30,000

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Furthermore an investment of about 70,000 u.a. is to be provided for the 1974 accounting period to meet the necessary modifications of building and facilities. These monies will be drawn from existing funds allocated under the heading "Direction and Coordination". The ten staff members involved in the action entitled "Training" should be taken as the annual participation average for a larger number of persons.



ANNEX VI

ANNEX VIREVISION OF THE ISPRA-1 REACTOR PROGRAMME1. Motivation

The decision taken by the Council of Ministers in February 1973 to cease neutron physics activities in the "Physics of condensed matter" programme and to continue these activities only in the framework of collaboration with the Max von Laue - Paul Langevin Institute at GRENoble had, during the year 1973, very marked consequences as regards the utilization of the ISPRA-1 reactor:

- (a) budgetary limitations which necessitated shutting down the reactor in the middle of the year;
- (b) staff limitations (to 15 + 3 local staff) which necessitated using more than half of the previous reactor manpower for the other programmes with complicated and inefficient time-schedules;
- (c) reduction of the time available for using the reactor for the two activities which were maintained (EURACOS shielding experiments and irradiation experiments).

Consequently, a realistic re-examination of the ISPRA-1 operating conditions became necessary. The criteria which followed were:

- any new alternative solution must be more economical (manpower or specific budget);
- the reactor shutdown must be as short as possible in order not to impede the shielding and irradiation experiments;
- the best use must be made of the existing staff;
- the solution must improve the performance of the shielding and irradiation experiments;
- the solution must be examined taking into account the whole remaining three-year plan (1974-1976).

2. Alternatives

Many solutions have been carefully examined, such as the construction of the simple TRIGA reactor in the ISPRA-1 pool, the use of the ECO pool for building a similar TRIGA, but finally only two alternatives were considered:

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- MODIFICATION of the ISPRA-1 reactor for operation at a 500 kW power level in good operating and maintenance conditions;
- USE OF THE OTHER INSTALLATIONS for the EURACOS shielding device and radioactivation activities.

## 2.1 Modification of ISPRA-1

For the purpose of operating the reactor at a low power level (500 kW), a number of modifications are necessary in order to enjoy improved safety conditions (start-up, shut-down, control) simplifying operation and maintenance to a considerable extent.

Some of these modifications concern the nuclear pile circuits; the chief of them are:

- Loading of the core with only 18 fuel elements;
- modification of the thermal column;
- installation of a neutron source for startup;
- elimination of some cooling circuits;
- adaptation of the nuclear control instrumentation to lower neutron intensities.

Other modifications concern the conventional circuits, such as:

- modification of the air-lock;
- automation of the air-conditioning;
- elimination of the rotary stabilizers and the Diesel power sets.

## 2.2 Use of other installations and ISPRA-1 closures

## 2.2.1 Shielding experiments:

Continuation of the present experiments with the EURACOS converter (bench-mark experiments, study of neutron streaming through straight and bent slits) does not involve the use of high-power reactors. Contacts have been

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set up with various organizations and institutes in order to study the optimal possibilities of EURACOS transfer (for instance, CESNEF, Milan; University of Pisa; University of Pavia; RCN, Petten). At the present time the transfer to Pavia is the most promising solution.

2.2.2 Irradiation experiments; radioactivation:

Reduction of the ISPRA-1 power to 500 kW would greatly reduce the efficiency of radioactivation analysis and radiotracer experiments.

An appreciable improvement in these facilities would be obtained by using the ESSOR high neutron flux associated with better operating conditions (temperature, flux homogeneity).

Installation of an irradiation facility would be necessary; a study presented and discussed in another paper gives all details regarding the feasibility and cost of such operation.

2.2.3 Irradiation experiments; radiation damage:

These experiments were begun in 1973 in the HFR, Petten (materials science programme). An item for this activity has been included in the 1974 budget.

The corresponding installations will be improved in order to fulfil the requirements of low and high-temperatures irradiations.

3. Budget items

3.1 First alternative: modification of ISPRA-1

The 1974 budget decision for ISPRA-1 (Chap. 2.27.0) is given here for the sake of clarity and for comparison purposes.

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The modification would call for the following expenses:

1974	Commitments	
Staff	224,314	15 officials and 3 local staff
Overtime	27,000	
Technical operating expenditure	136,000	
Purchase of uranium from USAEC	token entry	
Services to outsiders	(+24,000)	
Infrastructure	120,182	
Central Workshop	44,378	
	<hr/> 527,874 u.a.	
1975	532,000 u.a.	
1976	532,000 u.a.	

The modification would imply the following expenses:

Staff	200,000	13 officials
Technical operating expenditure (starting from 1975)	45,000	
Bonuses for arduous working	8,000	
Purchase of 18 uranium elements (4.5 kg of uranium-235) from USAEC	65,000	(the lease contract will expire 1974 and cannot be renewed)
Reprocessing of 96 elements (additional)	28,450*	
Reprocessing and return to the USAEC of the remaining 35 elements	29,200	
Leasing during 1974 (13 000 + 8 400)	21,400	
Transport of 25 elements	2,000	
Modification of the reactor loops	100,000	
Add: Purchase of 5.5 kg U <sup>235</sup> for EURACOS	72,000	

\* See Table 3.2.3

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3.2 Second alternative:

3.2.1 Transfer of EURACOS to Pavia

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u.a.

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Modification of the converter and the cooling circuit		
Adaptation of the control circuits	110,000	
Purchase of uranium for the converter	72,000	(new regulations of the USAEC)
Contract for neutron use	5,000/year	
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Total	182,000	
	+5,000/year	

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3.2.2 Construction of a RABBIT in ESSOR:

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u.a.

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Construction of the RABBIT	150,000	
Operating costs	-	supported by the CNEN
Irradiations during 1974	25,000	
Maintenance	5,000	

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3.2.3 Closing-down of the Ispra-1 reactor:

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u.a.

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Reprocessing of 96 fuel elements (71 shipped in 1973 + 25)	28,450	(total cost: 71,450 u.a. of which 43,000 u.a. was paid in 1973)
Renting 1974 of 96 fuel elements	13,000	
Transport of 25 elements from Ispra to EUREX	2,000	
Reprocessing of 33 new elements	32,000	
Leasing for 1974 of 33 elements	8,500	
Reprocessing of 20 elements for EURACOS before transfer	22,000	
Leasing EURACOS for 1974	6,500	
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	112,450	
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Provision for reprocessing price variations in 1974 (CEA reprocessing)	40,000	token entry

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The closing-down procedures comprise the following operations:

- D<sub>2</sub>O evacuation and reprocessing.
- Evacuation of the pool and transport of fuel elements to ESSOR pool.
- Handling and transport of the EURACOS converter.
- Evacuation of contaminated parts.
- Evacuation of all experimental facilities.
- Cleaning and decontamination.
- Fuel-element reprocessing operations.

The manpower necessary for these operations is estimated to be about 5 men/year (average of 15 personnel for 4 months).

#### 4. Conclusion

In the light of the foregoing, it is seen that the most satisfactory solution is to close down the ISPRA-1 reactor and to replace this facility by the transfer of EURACOS to Pavia, the construction of a rabbit in the ESSOR reactor and utilization of the PETTEN HFR reactor.

The following diagram shows the time-schedule and expenditure for 1974-76 (second alternative).

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Present Ispra-1 situation

1/1/74	1/1/75	1/1/76	31/12/76	Total/3 years
136 000 u.a. (specific appropriations)	137 000 u.a.	137 000 u.a.		410 000 u.a.
27 000 u.a. (overtime)	27 000 u.a.	27 000 u.a.		81 000 u.a.
15 men/year				Total 491 000 u.a.

1st Alternative

Modification Ispra-1 500 kW

Project, modifications, tests				
100 000 u.a. (modification)	13 men/year			100 000 u.a.
	45 000 u.a. (primary budget)	45 000 u.a.		90 000 u.a.
	8 000 u.a. (personnel costs)			8 000 u.a.
65 000 u.a. (purchase of uranium)				65 000 u.a.
57 650 u.a. (reprocessing)				57 650 u.a.
23 400 u.a. (leasing 74 & transp.)				23 400 u.a.
72 000 u.a. (purchase of U-EURACOS)				72 000 u.a.
				Total 416 050 u.a.

2nd Alternative

EURACOS transfer

Project, modifications				
110 000 u.a. (transfer)				110 000 u.a.
72 000 (purchase of U-EURACOS)				72 000 u.a.
	5 000 u.a. (neutrons)	5 000 u.a.		10 000 u.a.
1 man/year (for 12 months)	Operating costs covered by "Information Centres Programme"			

Construction of a RABBIT-ESSOR

Project, construction, tests, installations				
150 000 u.a. (construction)				150 000 u.a.
	5 000 u.a. (maintenance)	5 000 u.a.		10 000 u.a.
25 000 u.a. (irradiations)				25 000 u.a.
2 men/year (for 18 months)				

Closing of Ispra-1

Decontamination				
112 450 u.a. (reprocessing and end of lease contract)				112 450 u.a.
30 000 u.a. (closing-down)				30 000 u.a.
5 men/year (for 6 months)				
				Total 549 450 u.a.
				(+40 000 token



A N N E X VII

REVISION OF THE WASTE DISPOSAL PROGRAMME

In 1973, this research programme included work on:

1. Pyrochemical methods

During 1973 thermal decomposition experiments were carried out with uranyl and plutonyl complexes dissolved in binary and/or ternary eutectic mixtures of fused nitrates.

2. Actinide "separation"

In the field of solvent extraction, preliminary contracts were established with CNEN representatives concerning a new type of organic solvent patented as HX70 by CNEN (Casaccia) Laboratories. The representatives of CNEN were highly interested in collaboration with the Ispra laboratories.

As regards the research on separation by ion échange, experimental activity was started on two items:

- Measurements of coefficients of distribution of actinides on ion exchange media, organic and inorganic;
- Distribution of actinides between liquid and solid phases, during the concentration of high-activity waste.

3. Actinide processing

Preparatory work was performed on the experimental determination of the fission cross-section of actinides in unknown zones. The activities started up involved the following operations:

- Investigation of the Van de Graaf for nanosecond pulsing.
- Investigation of the electronic counting system for the time-of-flight measurements.
- Investigation of the detector calibration procedure for proton-recoil spectrometry.
- Preparation of the experimental block.

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4. Waste self-burying process

As regards the studies on self-burying, several blocks of salt (app. 1 m<sup>3</sup>) were machined to perform sinking tests with electrically heated capsules and different preliminary tests were carried out to find out the best working conditions for the electric heaters.

A bibliographic study of the physical properties of the salt was conducted but only values up to 400°C were found; experimental measurements of the thermal conductivity of the salt up to 800°C would be necessary.

5. Collection and evaluation of data

Before starting our programme on waste disposal and in order to orient our research correctly, contacts were made with research centres and experts. The material collected and the data already published will be processed by a systematic analysis.

The work was redirected after the first meeting of the Advisory Committee on Programme Management (held at Ispra on 24 January 1974) in order to take into consideration the opinions expressed by its members.

We therefore envisage:

- continuing the work on physics and chemistry, but abandoning the studies of the self-burying process, which had been considered doubtful from the point of view of safety;
- carrying out an appraisal of all of the problems raised by actinides in nuclear systems;
- examining the effects of radiation in glass matrices of the type proposed for the incorporation of low-activity waste;
- developing instruments for measuring  $\alpha$ -emitters in solid waste.

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During the first year there was a lack of manpower (15 "first-line researchers, mainly for the chemical studies), due principally to the impossibility of recruiting chemists. However, the work was mostly concerned with equipping the laboratories and did not fully occupy the staff provided.

We intend to bring the research staff up to 32 "first-liners", which would enable us to carry out our programme. The official number would thereby be decreased by 8 men/year.

Proposed allocations for the first year

1st-line personnel:	32 m/y
primary budget:	156,000 u.a.
computer calculations:	83 h

A N N E X V I I I

ANNEX VIIINEW ACTIVITIES OF THE PETTEN ESTABLISHMENT

At its meeting on 5 February 1973, the Council approved the JRC's multiannual research programme, which was drawn up on the assumption that the Petten establishment was to be closed down. The Council, however, requested the Commission to present suitable proposals for the Petten establishment as well (Doc. R/422/73 (ATO 25)).

At the Council meeting on 2 April 1973, the Commission stated that it wished to present new proposals as soon as possible, and in any event before the end of 1973. A working party was set up with the specific task of drawing up these proposals (Doc. R/1371/73 (ATO 105)).

The proposals were formulated on the basis of the following criteria:

- (a) the infrastructure and the skills of the Establishment are to be taken into account;
- (b) a disproportionately large reduction of the JRC staff at Petten is to be avoided; the number of staff as at 31 December 1972, that is approximately 160, must be considered as the minimum which can ensure the effective overall operation of the Establishment;
- (c) in the course of the multiannual programme, the Commission intends to concentrate at Ispra the research on materials associated with reactors.

The programme proposals are set out below. They cover a period of three years from 1 January 1974, and involve a staff of 72 (all lines) at the end of the programme. The JRC staff employed at Petten would thus number 167<sup>‡</sup>.

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<sup>‡</sup>It should be pointed out that operation of the HFR is ensured by a decision on a complementary four-year programme from 1 January 1973 (with a staff of 95).

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The proposed programme can be divided into two headings:

- (a) Technical and scientific activity in the field of chemistry in support of certain of the Commission's departments. This proposal is geared in particular to the especially extensive requirements of the Administration of the Customs Union department. This technical support activity should, however, become more clearly defined in time in other sectors as well, such as "technical barriers to the movement of goods", agriculture, etc.

This activity will be limited in the early stages, but will increase in importance progressively and may become the nucleus of a new vocation for the Establishment.

This work would have to develop in close contact with the competent Commission departments and in consultation with the national laboratories.

The work carried out for Administration of the Customs Union department could usefully be coordinated by the Committee on Common Customs Tariff Nomenclature set up by the Council (Regulation No 97/69, OJ No L 14/1 of 21 January 1969) and in particular by its Chemistry Subcommittee.

- (b) Research activity in the field of carbon technology and chemistry. The various research subjects proposed concern problems inherent in the protection of the environment, energy supplies and certain special uses of graphitic materials. This proposal enables the best possible use to be made of the special skills acquired over a period of many years at Petten in the field of graphites for nuclear uses.

ANNEX VIII

PROPOSAL No I

SCIENTIFIC AND TECHNICAL SUPPORT FOR THE DEPARTMENTS OF THE COMMISSION

(Administration of the Customs Union)

1. General introduction

The contacts that have been made with a number of the Commission's departments have shown that there is an urgent need for a more direct form of scientific and technical support than has been available in the past. The need for opinions and support in the chemistry field and in allied fields has been stressed in particular.

In the establishment of the programme of action, the accent was laid on the problems of the Administration of the Customs Union department (known as "ACU"), since these problems are of a well-defined nature and can thus be tackled without delay.

1.A Definition of the structure peculiar to ACU

Council Regulation (EEC) No 97/69 of January 1969 emphasized the necessity for the nomenclature of the Common Customs Tariff to be uniformly applied and set up a committee composed of representatives of the Member States and chaired by a representative of the Commission to implement the measures laid down in the regulation.

The Tariff Division of ACU is responsible for the administration of the Common Customs Tariff. Its staff has to contend with problems of a scientific and technical nature which it is unable to resolve without expert advice.

Cases in point are the preparation of tariff descriptions which call for an exact definition of a product, or group of products, with a precise indication of the chemical or physical properties, and the problems of classification, which call for reference to methods of chemical analysis or other scientific methods.



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Hitherto, this advice has been supplied on an ad hoc basis, partly by various national customs laboratories and partly by private laboratories. For a number of years, however, ACU has been trying to set on foot a system enabling it to obtain a more organized form of technical and scientific assistance from an independent laboratory. A number of countries have set up laboratories specializing in customs procedures and responsible for supplying tariff administrators with the scientific and technical assistance they need.

The creation by the Commission of a unit to back up ACU would in no way disturb relations with the customs laboratories of the Member States, whose task it is to supply their respective customs administrations with analyses and opinions.

#### 1.B. Other problems

Similar problems are encountered in the departments responsible for the removal of technical barriers to trade. This work involves similar methods of work to those of ACU (mixed committees) and derives from the Commission's responsibilities concerning the harmonization of legislation; thus there is close collaboration between ACU and these departments.

#### 2. Programme of action

This proposal provides for the use of the Petten establishment to give direct scientific and technical support on problems connected with chemistry.

##### 2.A Actions concerning ACU

In this context, it is proposed that the Petten establishment be assigned the following role:

- to supply ACU with the scientific and technical advice that is necessary for the preparation of the common customs tariff and the rules which ACU is responsible for administering;

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- to supply scientific and technical advice to resolve, within the common customs tariff, the classification problems that come before the Commission;
- to draw up proposals for harmonizing the methods of analysis and inspection to be used by the customs laboratories in the Member States;
- to promote cooperation between the Commission and customs laboratories in the Member States, to create a forum for the discussion of current technical problems and to ensure an effective and rapid exchange of information;
- to offer possibilities for the joint training and further training of the staff working in the customs laboratories;
- to advise and assist the customs services of the developing countries in respect of scientific and technical problems;
- to create consultative services for the developing countries which have, on various occasions, requested technical assistance from the Commission.

In the long term, the laboratory could also offer the Member States additional facilities: for example, it could acquire expensive equipment which would be made available to the national laboratories; it could also have facilities for the training and further training of customs laboratory staff and customs officials.

2.B Other actions

A support service comparable to that described above, essentially involving expertise in the chemistry field, is also of interest to other departments, in particular those responsible for regulations in the fields of agriculture and the free movement of goods.

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3. Execution of the programme

3.A Initial measures

Discussions with the government laboratories and with senior officials of ACU and other departments have clearly shown that it is impossible to supply effective scientific and technical support without first having accumulated a considerable amount of experience in the field in question. In order to overcome this difficulty, it is proposed that the building-up of the personnel and the tackling of the work be carried out gradually.

The action to be undertaken should begin with coordination work involving:

- the establishment of effective communications between the laboratory, the department of the Commission responsible and the competent national authorities by means of the creation of a technical secretariat and the appointment of the necessary officials to carry out this liaison work;
- the creation of working parties responsible for defining the laboratory method to be chosen for tackling the problems to be dealt with.

3.B Commencement of work

The next stage would consist in bringing in alongside the JRC staff experienced personnel seconded from the appropriate administrative departments of the Member States to form a joint team.

It would be appropriate, moreover, to begin with a training programme which would enable the staff to acquire a sound understanding of this type of work.

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At the end of the three-year period, the staff at the Petten establishment responsible for this work should be at full strength.

It must be stressed that the members of the national customs laboratories look upon Petten as a general-purpose centre where informal meetings can be held to discuss current technical problems and their possible solutions, and in the long term as a centre for the exchange of technical information.

3.C Management Committee for the ACU Support Unit

A management committee will have to be set up as soon as possible in order that this unit can have the maximum degree of effectiveness and its work can be suitably coordinated. This committee would be composed of the heads of the government laboratories responsible for customs work and of representatives of ACU and of the Petten establishment.

Its responsibilities would be the following:

- to give opinions on organization and equipment;
- to plan the work undertaken;
- to take decisions on priorities.

4. Range of activities

The detailed activities and their order of priority will be decided by the competent departments of the Commission case by case. ACU, for its part, will act in agreement with the management committee mentioned above.

Below is a preliminary list of the first-priority fields.

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4.A Fields for which ACU is responsible

- Milk and milk products.
- Oils and fats.
- Sugar, cocoa, cereals- and fruit-based preparations.
- Residues of the food industry.
- Petroleum and similar products.
- Products of the chemical industry.
- Plastic materials and synthetic rubber.
- Ceramic products.
- Common metals.

4.B Fields connected with agriculture

- Development and comparison of methods of analysis to verify criteria for composition and purity.
- Development of sampling systems which guarantee that random samples are representative.
- Assistance on scientific and technical problems involved in authorizing the use of certain constituents in foodstuffs (vegetable fats in chocolate-flavoured products, for example) or in fixing specific limits.
- Supplying data on specific subjects (bibliographical studies, available methods of analysis, etc.).

4.C Fields connected with the free movement of goods

- methods for the analysis of fertilizers;
- methods for the analysis of cosmetics;
- determination of the biodegradability and toxicity of detergents;
- listing of dangerous substances;
- processed foodstuffs.

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In view of the fact that the support activity implies work carried out in the short term, the mapping-out of a multiannual programme for all the staff would constitute a limitation on the range of such support operations. It is nevertheless desirable that a longer-term programme of activity be presented each year. The programme proposed for 1974 is set out in an annex to this document.

5. Budgetary and staff requirements

## 5.A "First-line" requirements

	1st-line staff at the end of the 3-year period	Specific appropriations over 3 years (u.a.)
Technical secretariat, liaison officials, information services, etc.	9	20,000
Training programme and secondments	3	-
Technical and scientific activities	18	140,000
Total: first-line staff	30	160,000

## 5.B Heavy equipment

At the moment, it is impossible to make a detailed analysis of heavy equipment requirements. An upper limit of 150,000 u.a. is proposed.

## 5.C Secondment from national laboratories

An amount of 0.2 million u.a. would be set aside to meet the mission expenses of officials from national laboratories seconded to Petten for an extended period in the context of the collaboration between laboratories.

This action will only begin during the second year.

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5.D Total budget for three years

The total number of staff, including general services and the administration, is 40. The total budget is approximately 2.5 million u.a.

ANNEX VIII

PROPOSAL No II

STUDIES ON THE RAW MATERIALS DERIVED FROM COAL

1. General introduction

The aim of this proposal is to enable the best possible use to be made of the knowhow and equipment which has now been available at Petten for some seven years in a field of research the importance of which to the Community is going to be considerable - the field in question being the technology of carbon.

In recent years, this Establishment has been in the forefront of research and development in the field of carbon, and more particularly in the areas of studies on structure, behaviour under irradiation and the influence of corrosive environments on the graphites used in the nuclear industry. Techniques such as direct-image electron microscopy, X-ray diffraction studies on crystalline properties, chemical reactivity, etc., have reached a degree of quality at Petten which is acknowledged by all the specialists in this field.

Henceforward, this knowhow will be directed towards research on the raw materials obtained from coal and their possible applications.

These studies could prove a construction towards making more economic use of certain products supplied by the coal industry. A similar activity, though directed more towards the technical aspects than to basic studies, has already been provided for by the Commission in its medium-term programme of technical research on coal, which was undertaken for a five-year period pursuant to Article 55 of the ECSC Treaty (Official Journal No 15/C 74 of 10 July 1972).



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2. Problems of carbon technology

2.A Removal of dust and sulphur from coal with a view to its use as fuel

Since a considerable increase in the consumption of energy is forecast for the next two decades and our dependence on uncertain supplies of crude oil will become even greater, it appears that coal and the coal industry will demand increased attention and more intense research work.

It is highly probable that a coal-processing industry will develop, and it is almost possible to establish a direct parallel between the coal industry of the future and the oil-refining industry of today.

One of the principal reasons for the development of the coal-refining industry as a matter of urgency is the increasing number of conditions imposed by environmental protection considerations, which will prohibit the large-scale use of coal with a high sulphur content. At the present time, the bulk of environmental protection work is concerned with the purification of fine gases. A better solution is to eliminate the sulphur during the refining of the rough coal. This process will be fairly costly but the expense will be compensated for in part by the improvement in the coal quality. Instead of the coal being used directly in the form in which it is extracted from the mine, a fully operational industry would be available to process the coal into a standardized product which could be used, not only for all its present applications as a fuel, but also as a raw material for a number of chemical products.

2.B Coal extraction by liquefaction

The more economic use of coal is based essentially on extraction by organic solvents, possibly followed by hydrogenation.

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The most ambitious long-term objective of these studies is the extraction of coal at a lower cost and under better safety conditions by means of in situ liquefaction with the aid of solvents and hydraulic transport to the surface. Similar techniques are already employed for washing out depleted oil wells. The indications are, therefore, that the technological difficulties raised by coal liquefaction using solvents can be overcome at essentially competitive prices.

#### 2.C Raw materials obtained from coal

The raw materials obtained from coal are also becoming increasingly important on account of the growing shortage of coke obtained from the refining of crude oil (petroleum coke). At the present time, the European Community is already importing two million tonnes of petroleum coke per annum. A few years ago, petroleum coke was a by-product, if not a waste product, of the oil industry, which was disposed of by burning in distillation plants. Nowadays oil refineries consider it as being of commercial value, but the primary aim in crude oil refining better fuel oil yields, which involves cracking at lower temperatures and little or no output of high-carbon-content materials. We can thus expect a serious shortage of the raw materials derived from oil-refining, even though the steel and aluminium industries will be consuming ever greater quantities of carbon or graphite electrodes.

#### 2.D New uses

Carbon-based materials are being used increasingly for the treatment of waste water and waste gases, and the use of active granules seems destined to expand tremendously.

Future environmental standards will generate a need for very large quantities of activated charcoal for use especially in the treatment

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of waste water; this will be true whatever process (biological or physico-chemical) takes over as the principal method for the treatment of waste water.

At the present time, activated charcoal is manufactured from animal or vegetable raw materials. The sharp increase in demand and the particular specifications required for the treatment of waste water will oblige manufacturers to make use of raw materials of mineral origin, and especially those obtained from processed coal.

Smaller quantities of isotropic coke are required as a result of the development of high-grade graphites for particular applications in the nuclear, aerospace, biomedical, metallurgical, etc., sectors. These applications are having a considerable impact on modern technologies and the importance of studying these materials should not be underestimated.

3. Nature of the proposed work

3.A The process of carbonization

Underlying this research programme is the fact that there can be no progress in carbon technology without a better understanding of the chemical and morphological processes of carbonization.

This programme should make it possible to design and produce carbon microstructures to meet the specifications peculiar to each intended use.

Recent work has shown that the morphology of carbon and graphite products is established when the raw material (generally a complex organic material derived from oil or coal) passes through the final stage of the liquid phase of carbonization. This stage is

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characterized by the transformation of the mass undergoing pyrolysis into a viscous liquid crystal, partly ordered, which is known as the carbon mesophase. As a result, the choice of the process used to control the morphology and the properties of the end-product depends to an appreciable extent on the chemistry of the initial material. It is now a matter of exploiting this new technology by endeavouring:

- (a) to improve the quality of conventional products by a more effective control of the microstructure, that is, by applying specific conditions of carbonization to selected raw materials;
- (b) to provide a more adequate scientific base for the development of new methods, not by random tests, but by the conscious application of our understanding of the behaviour of the mesophase during carbonization.

The general objective of the programme described here is thus to determine the technological basis for the manufacture of carbon and graphite products with specific morphologies. Although the main lines of future fundamental research on the carbon mesophase can be laid down now, the application of this technology to the development of specific products will have to be finalized after consultations with the interested parties.

### 3.B Raw materials

The solvent extraction of coal enables widely differing products to be obtained, depending on the type of coal and the extraction process used. Research in this field has so far been concentrated on coal desulphurization methods. The systematic research into the properties of these products from the point of view of their coking and graphitization has received far less attention.

#### 4. Proposal for a research programme

The research programme that has been drawn up comprises three sections:

##### 4.A Solvent extraction of coal

It is proposed that systematic research be carried out into the crude materials obtained from the coal extracted by solvents. The research should consider different varieties of coal and different methods of extraction. The essential aim of the study is to produce a wide range of chemical products which would constitute a suitable basis for the carbonization studies (see Proposal B).

A further objective is to assess the various solvent extraction processes with a view to their large-scale application in connection with the use of coal as a fuel.

##### 4.B The technology of carbonization

The technical objective of the programme consists in studying the way in which the morphology of carbon and graphite products can be controlled, and consequently in studying their properties by selecting the organic raw materials and by varying the different parameters of the carbonization process. A great effort should be made to improve the relationships between the molecular structure of the raw materials and the structures formed by pyrolysis.

A substantial effort should be devoted to studies on heteroatomic impurities (sulphur, oxygen and nitrogen) from the point of view of their influence on the formation of microstructures and of their affinity for certain microstructural constituents.

Quantitative data on the stability and the life (expressed in terms of time and temperature) of the plastic state of the mesophase might be obtained for different types of mesophase structures. A study will be made of the kinetics of hardening and an attempt will be made to establish the temperature-time transformation curves similar to those which are used to characterize metallurgical transformations. The deformability and the characteristic curves of the mesophase will be observed and the effects of deformation on structure and plasticity will be determined.

The previous studies on the response of the hardened mesophase to thermal treatments up to graphitization temperatures will be extended to cover the different types of structures and to measure the physical properties which are of special importance in the manufacture of carbon- and graphite-based components. The process of densification will be studied, since it affects the overall mesophase and the dimensional changes at the microscopic level parallel and perpendicular to the orientation of the layers of the mesophase.

Measurements of hardness and porosity will be carried out in parallel with the micrographic observations. Close attention will be paid to the phenomena of fissuration and contraction, since they make the interior accessible to impregnation or absorption products, and the fine porosity resulting from the release of heterogeneous atoms will be determined by absorption measurements.

#### 4.C Analysis of Certain Application and Case Studies

Under this heading, studies will be undertaken with the object of:

- (a) making an economic evaluation of certain proposed industrial applications based mainly on carbon;
- (b) defining, if possible, specifications for the materials in question and manufacturing new products on a laboratory scale.

As regards applications, particular attention will be paid to:

- (a) activated charcoal for the treatment of waste water;
- (b) special graphites for biomedical, metallurgical, aerospace, etc., applications.

ANNEX VIII5. Budget and staff requirements

## 5.A First-line requirements

	1st-line staff at the end of the 3-year period	Specific appropriations over 3 years (u.a.)
Solvent extraction work involving different types of coal	4	50,000
Study on pyrolytic behaviour and on morphology control	10	150,000
Case studies and practical analyses	8	100,000
Total	22	300,000

## 5.B Heavy equipment

Most of the heavy equipment is available. The budget will need to make provision for an appropriation of 130,000 u.a. to be applied principally to the purchase of a scanning microscope.

## 5.C Total budget for three years

The total number of staff, including general services and the administration, is 32. The total budget is approximately 2,250 000 u.a.

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Summary table of proposals for changes by objective

Objective	No of staff in programme (*)	Proposals +	Proposals -	New Staff (*)	OBSERVATIONS
1. Waste	40	-	8	32	The definition of this programme in 1973 has enabled the first-line staff to be stabilised at 32 Community servants (cf Annex IX).
2. Pu and TPN: - joint - complen.	63 42	-	-	63 42	Routine progress of programme No change proposed
Materials: 3. - 'A' 4. - 'B'	50 { 29 } 79	{ -	{	{ 79	Experience in 1973 showed the need for a slight readjustment of first-line staff to assure better use of scientific and technical services without changing either the substance or the general pattern of the programme. For reasons of coherence and efficiency, an amalgamation of the two programmes 'A' and 'B' is suggested.
5. Reactor safety	115	7	-	122	In view of the normal course followed by the experimental part of this programme, a need was noted for greater theoretical support; it is proposed to increase this from 7 to 14 man-years, thus bringing the first-line staff from 115 up to 122 Community servants (cf. Annex II)
( Data processing	31	-	-	31	Routine progress of programme. No change proposed
7. Analyst's office	27	-	-	27	Routine progress of programme. No change proposed
8. CBNM	92	-	-	92	Routine progress of programme. No change proposed
9. Assistance to operators	23	-	-	23	Routine progress of programme. No change proposed
10. Training	10	-	-	10	Programme entering active phase. No change proposed
11. Supervision of fissile materials	27	-	-	27	Routine progress of programme.

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Objective	No of staff in programme (*)	Proposals + -	New Staff (*)	OBSERVATIONS
12. Research under contract	5	- -	5	No change proposed. The part of the MAL (Medium Activity Laboratory) funded under this programme should be reduced in 1974 by the award of two contracts to the value of about 100,000 u.a.
13. Direction	55	- -	55	
14. HFR	95	- -	95	Routine progress of programme. No change proposed.
15. Ispra-1	15	- 15	0	The use of other installations should give the best chance of securing profitability from the services provided to date by Ispra-1, the closure of which is proposed (cf. Annex VIII).
16. CBR - 'A' - 'B'	39	- -	39	Routine progress of programme. No change proposed.
17. Environment - 'A' - 'B'	93	- -	93	Routine progress of programme. No change proposed.
18. Remote sensing	4	4 -	8	Completion of the first phase means that a proposal can be made to increase the number of first-line staff under this programme to 8.
19. New techniques - solar energy - recycling	7 8	- - - -	7 8	The definition of this programme and completion of the first phase make it possible to propose an appreciable staff increase (cf. Annex V, sec. 2). It is proposed to confine the initial programme to systems analysis studies and accordingly to reduce to 7 the first-line personnel engaged on this project (cf. Annex V, sec. 1).

Objective	No of staff in programme (*)	Proposals +	Proposals -	New staff (*)	OBSERVATIONS
20. Hydrogen	37	-	-	37	Programme in progress. No change in staffing proposed. An increase of 150,000 u.a. in specific funds is, however requested, so as to raise the contribution of outside bodies via contracts (cf. Annex II).
21. Assistance to Commission	12	-	-	12	Programme following normal course, under the responsibility of the Directorates-General concerned, charged to the general budget in the 1974 Budget.
22. Fusion	0	12	-	12	New programme confined to conceptual studies and the corresponding feasibility studies on the basis of the Fusion Liaison Group's recommendation of 12-13 December 1973 (cf. Annex III).
23. Petten	0	52	-	52	New programme for the Petten Establishment, consisting of two main activities: studies on coal and back-up for customs union administration activities (cf. Annex VIII).
24. COST-11	4	-	-	4	For the record, Programme following normal course under the COST-11 agreement.
TOTAL	923	+ 75	- 23	975	

(\*) Personnel engaged directly on research.

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TOTAL PROPOSED RESOURCES IN APPROPRIATIONS

1. The review of the objectives adopted by the Council on 14 May and 18 June 1973 does not in itself entail any direct effect on the total volume of the four-year programme (see Table 1), but it does entail a number of rearrangements or readjustments between objectives and also extra funds for new activities (fusion reactors).

On the basis of the 1973 budget estimates, an estimated time schedule of expenditure has been drawn up (see Table 1). The rate of expenditure for 1973 and 1974 has been restricted by the existence of a staff deficit (in all numbering about 40) resulting from conservative and reorganization measures at the start of programmes and from the departure of 94 employees under special termination of service measures (the "volontariat").

From 1975, it is planned to bring the numbers employed up to the personnel authorized. It should be noted that in 1973, besides a proportion of the increases for wages and salaries and for services provided, unscheduled expenditure on the completion of previous programmes was absorbed into the budget.

2. The expenditure and personnel required for the proposed new activities at the Petten establishment (1974-76) are shown in Table 1, i.e. about 4 750 000 u.a.

3. The creation of an overall reserve is also necessary in order to meet pay increases not included in the original estimates.

An anticipative fraction of this reserve could be entered in the annual budget and formally allocated, for example, in September each year, in accordance with the date from the previous June-June period.

At that same time, the budget for the succeeding year is being negotiated, and the reserve in question would be determined accordingly.

This system constitutes a kind of "sliding plan" and should provide a constant view of the progress of the work and the trend of expenditure.

Assuming that the pay increases are 10% per annum (5% on 1 January and 5% on 1 July), the amount of the overall reserve would be 21.2 million u.a. (see Table 1), a fraction of which would be estimated and corrected each year.

TABLE 1

## OVERALL BUDGET AND TIME SCHEDULE FOR 1973/76 AMENDED PROGRAMME

Headings	1973 <sup>(7)</sup>	1974	1975	1976	Totals
ISFRA, KARLSRUHE, GEEL AND PETTER (HFR)					
Staff pay <sup>(2)</sup> (Officials)	17,695,154	19,552,432	20,903,274	21,541,598	79,698,458
(Establishment staff (3))	2,952,347	5,141,819	5,121,486	5,250,130	19,465,782
(Local staff (3))	2,305,251	2,536,142	2,588,479	2,641,133	10,071,005
(Total)	23,952,752	27,230,393	28,613,239	29,438,861	109,235,245
Operating appropriations <sup>(4)</sup>	16,111,030	( 1 300 000 <sup>(5)</sup> ) ( 16,512,167	17,277,070	18,064,488	69,264,755
TOTAL	40,063,782	45,042,560	45,890,309	47,503,349	178,500,000 <sup>(1)</sup>
PETTER ESTABLISHMENT (NEW ACTIVITIES)					
Staff pay (Officials)	(8)	683,214	911,790	963,930	2,558,934
(Establishment staff)	-	112,288	124,215	167,314	403,717
(Local staff)		15,418	23,820	40,890	80,128
(Total)		810,820	1,059,825	1,172,134	3,042,779
Operating appropriations		486,800	639,750	577,594	1,704,144
TOTAL		1,297,620	1,699,575	1,749,728	4,746,923
OVERALL RESERVE					
Estimate of pay increases <sup>(6)</sup>	1,373,000	3,250,000	6,450,000	10,177,000	21,250,000
RESERVE					

- (1) Overall budget of the appropriations adopted by the Council (including the action entitled "European data-processing network"). The launching of the "fusion reactors" action is balanced out by the inclusion in the general budget of the action on "technical assessment in support of the Commission's activities".
- (2) With increasing seniority of staff: 1.038 percent per annum for officials and 1.03 percent per annum for other Community servants.
- (3) Estimates take account of the proposed recruitment of a proportion of staff on a freelance basis from 1974 onwards (doc COM(74)16).
- (4) With a change of about 5 percent per annum.
- (5) Investments of the CERN.
- (6) With a 10 percent per annum change in wages and salaries (5 percent on 1 January and 5 percent on 1 July).
- (7) The total and the reserve are in accordance with the 1973 Budget.
- (8) Expenditure absorbed in the 1973 Budget (mainly from 'staff awaiting assignment to a post').

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Annexe XI

ISPRA ESTABLISHMENT

	List line	TOTAL	
		(1)	(2)
Waste processing and storage	32	61	57
Materials	79	157	146
Hydrogen production	37	76	71
Reactor safety	122	258	239
Applied data processing	31	57	51
Information analysis office	27	56	52
Assistance to power plant operators	23	61	57
Training	10	17	16
Ispra-I	-		
Assistance to Commission	12	23	21
COST 11	4	7	6
Research under contract	5	19	18
Standard and reference materials	39	77	72
Environment	93	186	173
Remote Sensing	8	22	19
New technologies	15	35	33
Supervision of fissile materials	27	62	57
Fusion	12	23	21
Directorate-General	55	77	72
Biology	-	20	20
<b>TOTAL</b>	<b>631</b>	<b>1201</b>	<b>1294</b>

- (1) with payroll increase due to the establishment as full staff members of a certain number of maintenance staff.
- (2) without payroll increase due to the establishment as full staff members of a certain number of maintenance staff.

OTHER ESTABLISHMENTS

	1st line	Total programme	
		(2)	(3)
<u>Institution for Transuranic Elements</u>			
- Joint programme	63	133	126
- Complementary programme	42	88 <u>221</u>	84 <u>210</u>
CBNM	92	174	170
<u>Petten</u>			
- HFR	-	95	95
- New activities <sup>1</sup>	52	72	72

1

Estimated staff for 1976 :

1974 : first line 34  
Total 54

1975 : first line 47  
Total 67

2 with payroll increase due to the establishment as full staff members of a certain number of maintenance staff

3 without payroll increase due to the establishment as full staff members of a certain number of maintenance staff

Breakdown of staff by appropriation account  
and establishment

1. With payroll increase due to the establishment as full staff members of contract maintenance staff.

Establishment	Scientific Divisions		Scientific and Technical Support	Major Installations	Infra-structure	TOTAL
	1st line	Direct service				
ISPRA	631	72	182 <sup>1)</sup>	44	365	1.294
Institution for Transuranic Elements	105	-	24	46	46	221
CEMM	92	-	30	21	31	174
PEPTEN						
+ HFR	-	-	-	95	-	95
- New Activities	52	-	4	-	16	72

1) of which design office 20, workshops 106, support for electronics 27, support for chemistry 19, support for planning 10

2. without payroll increase due to the establishment as full staff members of a certain number of contract maintenance staff. (see p. 78 for table headings)

Establishment	Scientific Divisions		Scientific and Technical Support	Major installations	Infra-structure	TOTAL
	1st line	Direct service				
ISPRA	631	72	182	36	280	1.291
Institution for Transuranic Elements	105	-	24	46	35	210
CEMM	92	-	30	21	27	170
PEPTEN						
- HFR	-	-	-	95	-	95
- New Activities	52	-	4	-	16	72

B. PROPOSAL FOR THE REVISION OF THE 1973-75 PROGRAMME

OF INDIRECT ACTION

INDIRECT ACTION  
ON ENVIRONMENTAL PROTECTION

When adopting its Decisions on the European Community's multiannual research and training programme, the Council made provision for the programme of indirect action in the field of protection of the environment to be revised at the beginning of the second year (1974).

Pursuant to these provisions, the Commission is laying before the Council a proposal for the revision of this action solely concerning the staff allocated for its management, since the content of the research programme and the overall budget remain unchanged.

On 18 June 1973 the Council decided to assign total appropriations of 6.3 million u.a. and a staff of four to the indirect action on protection of the environment.

The launching of the action, and in particular the preparation of numerous research contracts, revealed the inadequate number of staff allocated to it.

Sixty to eighty research contracts which must be coherent from the scientific, administrative and financial points of view should be concluded. These contracts relate to an extremely varied selection of scientific fields (physics, chemistry, data processing, biology, ecology, toxicology, epidemiology, engineering, etc.) in view of the multidisciplinary nature of the problems involved in the protection of the environment.

The staff managing this programme should as a body be familiar with all of these fields even if they may, in certain instances, call upon the services of the JRC or of other departments of the Commission.

The tasks of the management group for this action are not restricted to the selection of research proposals nor to the negotiation of contracts. In order to use Community funds efficiently, the performance of the research covered by the contracts must be closely supervised, the research teams engaged in the action must be coordinated, the results obtained must be analysed, and the programme must be continuously updated on the basis of the data obtained and as a function of the new research needs revealed in the programme of action on the environment. These activities also require a constant updating of the scientific knowledge acquired in this field, particularly via inventories and

analyses of the research in progress.

It should be noted that the group also provides the Secretariat for the three COST agreements on pollution (61a, 64b, 68).

On the other hand, the conclusion and follow-up of the contracts, the organization of the meetings of the Advisory Committee on Environmental Research Programmes Management, groups of experts and COST Management Committees, the research inventory etc., represent a considerable volume of administrative and secretarial work.

Consequently, the Council is requested, without amending the total amount of appropriations allocated, to increase the staff assigned to the action from the current figure of 4 (3 A + 1 C) to 8 (4 category A, 1 category B (B3/B2), 3 category C).

This figure appears reasonable in comparison to that which is practised in the member-states for similar programmes at a national level .

## PROPOSAL FOR A COUNCIL DECISION

on

amending the research and training programme for the  
European Atomic Energy Community

The Council of the European Communities,

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

HAVING regard to the proposal from the Commission put forward after consultation with the Scientific and Technical Committee;

WHEREAS the Council adopted on 14 May and 18 June, 1973, a research and training programme for the European Atomic Energy Community, and WHEREAS Article 3 of the Decision on the programme provided for the revision of this programme at the beginning of its second year;

WHEREAS it therefore seems appropriate to amend certain parts of the above mentioned programme;

WHEREAS in the context of the common policy on science and technology, the multiannual research and training programme is one of the principal means whereby the Community can contribute to the speedy establishment and growth of nuclear industries and also to the acquisition and dissemination of information in the nuclear field;

has decided as follows:

Article 1

The research and training programme shall be amended as from 1 July, 1974, in respect of the actions set out in the Annex which forms part integral part of this decision.

Article 2

The upper limit for expenditure, commitments and for staff necessary for the implementation of this amended programme shall be 38.145 million units of account and 412 Community servants for the duration of the programme.

The unit of account is defined in the Financial Regulations establishing and implementing the budget of the European Communities and concerning the responsibility of authorising and accounting officers.

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Article 3

The programme set out in the Annex shall be subject to annual review in accordance with the appropriate procedures.

Done in Brussels,

for the Council

for the Council

The President



MULTIANNUAL RESEARCH AND TRAINING PROGRAMMEDirect Action1. Waste Processing and Storage

A maximum of 5.950 million units of account shall be allocated to this objective, the number of staff being fixed at 57 Community servants, including a programme staff of 32 Community servants.

The objective includes :

- basic studies on the separation of fission products from irradiated fuel by the "Saltex" process;
- studies and research on the chemical separation of actinides from high level radioactive waste;
- physical measurements to determine the neutronic properties of actinides and studies to establish the optimum conditions for their consumption in reactors;
- activities concerning the processing of low-level radioactive waste and instrumentation for alpha-emitters.

These activities will be carried out mainly by the ISPRA establishment.

2. Reactor safety

A maximum of 21.7 million units of account shall be allocated to this objective, the number of staff being fixed at 239 Community servants, (including a programme staff of 122 Community servants)

This objective shall include:

- engineering research associated with serious accidents and their prevention;
- research into thermohydraulic phenomena in the coolants associated with accidents;
- early failure detection;
- reliability studies;
- theoretical accident analysis.

These activities shall be carried out by the ISPRA establishment.

### 3. Training

A maximum of 1.6 million units of account shall be allocated for this objective, the number of staff being fixed at 16 Community servants (including a programme staff of 10 Community servants).

This objective includes:

- technical courses, post-graduate courses and advanced specialisation courses;
- a projected summer school in physics, to be held in 1975;
- the study of a proposal on "European Summer Schools".

### 4. Closing-down of ISPRA - I reactor and transfer of relevant activities.

A maximum amount of 1.35 million units of account shall be allocated to this objective, the number of staff being fixed at 8 Community servants (including a programme staff of 5 Community servants).

The programme comprises:

- (1) the closing-down of the reactor;
- (2) the transfer of the Euracos convertor alongside the Pavia reactor;
- (3) the construction of a pneumatic irradiation facility, the installation thereof in the Essor reactor and the operation thereof.

The closing-down and transfer operations shall be spread over eighteen months (of which six months will be for the closing-down proper)-

### 5. Production of Hydrogen

A maximum of 6.7 million units of account shall be allocated to this objective, the staff being fixed at 71 Community servants (including a programme staff of 37 Community servants).

The objective includes:

- chemical studies: thermodynamic calculations; verification of unknown reactions; measurements of the physical properties of the compounds used; study of the influence of impurities, etc.
- kinetic studies: determination of reaction parameters (kinetics, yield, etc.) by means of various continuous reactions, on a laboratory scale and then of complete cycles, also on a laboratory scale;
- material studies: corrosion tests, initially for exploratory assessments and then for quantitative measurements on the materials scheduled;

- chemical engineering studies: preliminary definitions of flowsheets; cycle optimization calculations; studies on the pairing of chemical processes in reactors;

In an initial phase the emphasis will be on defining the data required for the assessment, in conjunction with the circles concerned, of the technical and economic potential of the process. Certain contracts will be concluded to this end.

These activities shall be carried out by the ISPRA establishment.

6. Fusion

A maximum amount of 1.8 million units of account shall be allocated to this objective, the staff being fixed at 21 Community servants, (including a programme staff of 12 Community servants).

This objective shall consist in direct support for studies on thermo-nuclear fusion reactors being carried out by the "systems group" within the "Fusion" associations.

The ISPRA contribution shall cover magnetic and inertial confinement systems and shall include reliability studies and experiments relating for the most part to the nuclear problem in thermo-mechanics and the problem of the first wall, the cladding and shielding of the magnet and design studies on the assembly, operation and impact on the environment of the reactor.

Draft  
COUNCIL DECISION  
OF  
ADOPTING A RESEARCH PROGRAMME FOR THE  
EUROPEAN ECONOMIC COMMUNITY.

The Council of the European Communities;

HAVING regard to the Treaty establishing the European Economic Community, and in particular Article 235 thereof,

HAVING regard to the proposal from the Commission,

HAVING regard to the opinion of the European Parliament,

WHEREAS, pursuant to Article 2 of the Treaty establishing the European Economic Community, the activities of the Community shall include inter alia the promotion, throughout the Community, of a harmonious development of economic activities and of a continuous and balanced expansion.

WHEREAS, pursuant to Article 3 (a), (b) and (h) of the Treaty establishing the European Economic Community, the activities of the Community shall include the elimination, as between Member States, of quantitative restrictions on the import and export of goods, and of all other measures having equivalent effect, the establishment of a common Customs tariff and the approximation of the laws of Member States to the extent required for the proper functioning of the Common Market;

WHEREAS, the research projects forming the subject of this decision therefore are seen to be necessary in order to achieve the abovementioned aims of the Community in the functioning of the Common Market;

WHEREAS the Treaty establishing the European Economic Community has not provided the necessary powers;

HAS DECIDED AS FOLLOWS:

Article 1

A research programme for the European Economic Community as set out in the Annex, is hereby adopted as from 1. July 1974 to the end of 1976.

The Annex forms an integral part of this decision.

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- 2 -Article 2

The upper limit for expenditure commitments and for staff necessary for the implementation of this programme shall be 4.75 million u.a. and 72 Community servants, the unit of account being defined in the Financial Regulation on the establishing and implementing the budget of the European Communities and concerning the responsibility of authorizing and accounting officers.

Article 3

The Commission shall ensure this programme is carried out and, to this end, shall request the assistance of the Joint Research Centre (Petten establishment).

It shall submit an annual report to the Council on the subject.

Article 4

The programme set out in the Annex shall be subject to annual review in accordance with the appropriate procedures.

Article 5

The information resulting from the implementation of the parts of the programme set out in the Annex, shall be disseminated in accordance with the conditions and within the limits which shall be fixed at a later date.

Done at Brussels,

for the Council

The President.

DIRECT ACTION

(non-nuclear projects)

A maximum amount of 4.75 million u.a. shall be allocated to this objective, the staff being fixed at 72 Community servants (including a programme staff of 52 Community servants).

The objective shall comprise two actions:

(1) Scientific and technical support for the departments of the Commission (Administration of the Customs Union)

A maximum amount of 2.5 million u.a. shall be allocated to this objective, the staff being fixed at 40 Community servants (including a programme staff of 30 Community servants).

This technical support to the departments of the Commission shall comprise:

- supplying the administration of the Customs Union with the scientific and technical advice needed for producing the Common Customs Tariff and the regulations which it is responsible for administering;
- supplying scientific and technical advice enabling classification problems submitted to the Commission to be solved within the Common Customs Tariff;
- drawing up proposals on harmonising the methods of analysis and examination to be used by Customs laboratories in the Member States;
- promoting cooperation between the Commission and Customs laboratories in the Member States, setting up a forum for the discussion of current technical problems and ensuring that there is an efficient, rapid exchange of information;
- offering opportunities for joint training and refresher courses for staff working in Customs laboratories;
- providing scientific and technical advice and assistance to the Customs services of developing countries;
- setting up consultative services for those developing countries which, on various occasions, have requested technical assistance from the Commission.

In the present case, similar activities may be carried out for the benefit of other departments of the Commission.

These activities shall be carried out by the Petten establishment.

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-A-(2) Studies on raw materials derived from coal.

The appropriations for this field of activity have been fixed at 2.25 million u.a., together with a staff of 32 Community servants (including a programme staff of 22 Community servants).

This field of activity comprises the following:

- case studies and practical analyses:
  - technical and economic assessment of the application of a carbon product technology based on coal extracts aimed at the production from, inter alia, activated carbon, special graphites, materials used in biology, etc.;
  - definition, specification and classification of the materials produced, feasibility studies on methods of extraction;
- experimental work on the carbonisation of coal extracts (in particular, study of the mesophase and its importance from the point of view of the development of special products);
- experiments on the solvent extraction of coal to support the activities on "carbonization studies".

These activities shall be carried out by the Petten establishment.

PROPOSAL FOR A  
COUNCIL DECISION  
OF

amending the research programme for the European Economic  
Community in the remote-sensing of earth resources

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The Council of the European Communities;

Having regard to the Treaty establishing the European Economic  
Community, and in particular Articles 41 and 235 thereof;

Having regard to the Council Decisions of 14 May 1973 establishing the  
a research programme for the European Economic Community on the  
remote-sensing of earth resources, and whereas Article 4 of the  
Decision on the programme provides for a review of this programme  
at the beginning of the second year thereof;

Having regard to the proposal from the Commission;

Having regard to the Opinion of the European Parliament;

Whereas Article 2 of the Treaty establishing the European Economic  
Community assigns to the Community, inter alia the task of pro-  
moting throughout the Community a harmonious development of economic  
activities, a continuous and balanced expansion and an accelerated  
raising of the standard of living; whereas the objectives of the  
Community's activities for these purposes are set out in Article 3  
of the same Treaty;

Whereas the purpose of the projects which are the subject of this  
Decision is, in the initial phase, to offer to the Community a means  
of drawing up statistics and forecasts which may be used in various  
fields including agriculture;



Whereas the problem of evaluating and using natural resources constitutes an important element of these objectives;

Whereas the research projects which are the subject of this Decision seem necessary in order to achieve certain Community objectives in the context of the functioning of the common market;

Whereas the Treaty establishing the European Economic Community made no provision for the powers required for these purposes;

Whereas it therefore seems appropriate to revise certain parts of the above mentioned programme;

HAS DECIDED AS FOLLOWS:

Article 1

The research programme for the European Economic Community on the remote-sensing of earth resources shall be revised as from 1 July 1974, as set out in the Annex. The Annex forms an integral part of this Decision.

Article 2

The upper limit for the expenditure commitments and for the staff necessary for the implementation of this amended programme shall be 1.8 million u.a. and 19 Community servants, the unit of account being defined in the Financial Regulation establishing and implementing the budget of the European Communities and concerning the responsibility of authorizing and accounting officers.

Article 3

The Commission shall ensure that this programme is implemented. It shall submit annual reports to the Council on this subject.

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Article 4

The programme set out in the Annex shall be subject to annual revision in accordance with the appropriate procedures.

Article 5

The information resulting from the implementation of the parts of the programme set out in the Annex shall be disseminated in accordance with the conditions and within the limits which are to be fixed at a later date.

Done at Brussels,

For the Council

The President

ANNEX

D  
Direct Action

Non-nuclear projects

Remote-sensing of earth resources

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A maximum amount of 1.8 million u.a. shall be allocated to this objective, the staff being fixed at 19 Community servants (including a programme staff of 8 Community servants).

The objective shall comprise direct support to the departments of the Commission. A pilot experiment on irrigated fields and different types of forest shall be carried out with a view to establishing a technique enabling production inventories and assessments to be made on the basis of aerial and spatial observations.

These activities shall be carried out by the Ispra Establishment in conjunction with the Directorates-General concerned.

PROPOSAL FOR A COUNCIL DECISIONOF

revising the staff required for the implementation  
of the research programmes of the European Economic  
Community and the European Atomic Energy Community

(direct action) adopted by the Council on

14 May and 18 June 1973

The Council of the European Communities;

Having regard to the Treaty establishing the European Economic  
Community, and in particular Articles 41 and 235 thereof,

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

Whereas the Council adopted on 14 May and 18 June 1973 a research  
programme for the European Economic Community and for the Euro-  
pean Atomic Energy Community (direct action), and foreseeing the  
revisions of this programme at the beginning of the second year,

Having regard to the proposal from the Commission submitted after  
consultation with the Scientific and Technical Committee,

Having regard to the Opinion of the European Parliament,

Whereas it is necessary to recruit 108 full-time established  
staff currently in the service of undertakings bound to the  
Community by contracts and therefore assigned to the implemen-  
tation of the above mentioned programmes,

Whereas it is therefore necessary to amend these programme  
decisions in order to adjust the number of staff involved;

HAS DECIDED AS FOLLOWS :

Sole Article

The staff specified in Article 2 of the above mentioned programme  
decisions shall be revised in accordance with the conditions set  
in the Annex hereto. This Annex forms an integral part of this  
Decision.

Done at Brussels,  
For the Council  
The President.

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OBJECTIVES	PROGRAMME STAFF	NEW TOTAL STAFF
- Waste processing and storage	32	61
- Plutonium and transplutonic elements	63	133
- Materials science and pure research into materials	79	157
- Applications of nuclear energy not concerned with electricity pro- duction (hydrogen production)	37	76
- Reactor safety	122	258
- Applied data processing	31	57
- Information analysis offices	27	56
- CBNM	92	174
- Technical support to power plant operators	23	61
- Training data processing network (COST II)	10	17
- Ispra I	p.m.	p.m.
- Technical assessments in support of the Commission's activities	12	23
- European data processing network (COST II)	4	7
- Contract research	5	19
- Standards and reference materials	39	77
- Protection of the environment	93	186
- Remote-sensing of earth resources	8	22
- New technologies	15	35
- Fusion reactors	12	23
- Direction and coordination	55	77
- New activities at Petten	52	72
<b>Total joint programme</b>	<b>811</b>	<b>14591</b>
- Plutonium and transplutonic elements	42	88
- Supervision and management of fissile materials	27	62
- HFR	--	95
<b>Total complementary programme</b>	<b>69</b>	<b>245</b>
<b>GRAND TOTAL</b>	<b>880</b>	<b>1.836</b>

Proposal for a  
COUNCIL DECISION  
of \_\_\_\_\_

amending the upper limits for amounts  
to be allocated to the research programmes of  
the European Atomic Energy Community and of the European  
Economic Community adopted by Council decisions  
of 14 May and 18 June 1973

The Council of the European Communities;

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

Having regard to the Treaty establishing the European Economic  
Community, and in particular Article 235 thereof;

Having regard to the proposal from the Commission, which has con-  
sulted the Scientific and Technical Committee;

Having regard to the Opinion of the European Parliament;

Whereas under the terms of Article 176 of the Treaty establishing  
the EAEC, the Council Decision adopting the research and investment  
programme constitutes the limit of the appropriations which can be  
allocated to expenditure on research and investment;

Whereas the Decisions adopted by the Council on 14 May and 18 June  
1973 also fix a maximum amount for the expenditure commitments  
relating to each of the above-mentioned programmes;

Whereas the above mentioned maximum amounts must consequently be amended in order to enable a reserve fund intended to cover increased payroll charges to be entered in the budget,

HAS DECIDED AS FOLLOWS :

Sole Article

To the maximum amounts for the expenditure commitments set out in the Council Decisions of 14 May and 18 June 1973 shall be added an overall reserve of 21.2 million units of account. Each year this reserve shall be apportioned among the various objectives of the programme through the budget.

Done at Brussels,

For the Council  
The President

PROPOSAL FOR A COUNCIL DECISION  
OF

amending the research programme for the European  
Economic Community on the protection of the environ-  
ment (indirect action).

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The Council of the European Communities;

Having regard to the Treaty establishing the European Economic  
Community, and in particular Article 235 thereof;

Whereas the Council adopted on 18 June 1973 as provided for in  
Article 235 of the Treaty establishing the European Economic Commu-  
nity a research programme for the European Economic Community on the  
protection of the environment (indirect action), and whereas Article  
4 of the programme decision provided for the revision of this pro-  
gramme at the beginning of the second year;

Having regard to the proposal from the Commission;

Having regard to the Opinion of the European Parliament;

Whereas Article 3 of the Treaty establishing the European Economic  
Community lays down that the activities of the Community shall  
include the elimination, as between Member States, of customs duties  
and of quantitative restrictions on the import and export of goods,  
and of all other measures having equivalent effect, the institution  
of a system ensuring that competition in the common market is not  
distorted, and also the approximation of the laws of Member States  
to the extent required for the proper functioning of the common  
market; whereas the activities defined in the Annex to this Decision  
are necessary, among others, for achieving these objectives and pro-  
moting, in accordance with Article 2 of the same Treaty, a harmon-  
ious development of economic activities throughout the Community and  
and improvement in conditions of life and employment in the Member  
States;



Whereas the research projects which are the subject of this Decision therefore appear necessary in order to achieve certain Community objectives in the context of the functioning of the common market;

Whereas the Treaty establishing the European Economic Community made no provision for the powers required for these purposes;

Whereas it therefore seems appropriate to revise certain parts of the above mentioned programme;

HAS DECIDED AS FOLLOWS:

Article 1

The research programme for the European Economic Community on the protection of the environment shall be amended, as effect from 1 May 1974, as set out in the Annex. The Annex forms an integral part of this Decision.

Article 2

The upper limits for expenditure commitments and staff necessary for the implementation of this amended programme shall be 6.3 million units of account and eight Community servants, the unit of account being defined in the Financial Regulation establishing and implementing the budget of the European Communities and concerning the responsibility of authorizing and accounting officers.

Article 3

The Commission shall ensure that this programme is carried out. It shall submit an annual report to the Council on the subject.

Article 4

The programme set out in the Annex shall be subject to annual revision in accordance with the appropriate procedures.

Article 5

The information resulting from the implementation of the parts of the programme set out in the Annex shall be disseminated in accordance with the conditions and within the limits which are to be fixed at a later date.

Done at Brussels,

For the Council

The President.

ANNEX

Indirect action  
Non-nuclear action  
Protection of the environment  
Pollution and nuisances  
Joint programme

A maximum amount of 6.3 million units of account and a staff of eight Community servants shall be allocated to this objective.

The objective shall include :

- (a) Setting up a data bank on chemical products likely to contaminate the environment;
- (b) Toxicity of lead;
- (c) Epidemiological surveys of the effects of air and water pollution;
- (d) Effects of micropollutants on man;
- (e) Assessment of the ecological effects of water pollutants;
- (f) Remote-sensing of atmospheric pollution;

The surveys and laboratory projects shall be performed by means of contracts.

OPINION OF THE GENERAL ADVISORY COMMITTEE OF THE JRC

During its fourteenth meeting, held on 13 March 1974, the General Advisory Committee of the JRC examined the "Draft Revision of the Multiannual Programme for the JRC" and a draft new programme for the Petten Establishment (Doc. GAC-100).

1. The Committee did not feel obliged to express an opinion on the financial aspects of the development of economic conditions.
2. On the whole, the opinion on which it delivers the proposals for the revision of the following programmes is favourable:

-- Reactor safety	-- Annex II	to document GAC-100			
-- Hydrogen production	-- " III	" " "			
-- Remote sensing	-- " IV	" " "			
-- Fusion reactors	-- " VI	" " "			
-- Training	-- " VII	" " "			
-- Ispra-1 reactor					
second alternative:					
closing-down of reactor	" VIII	" " "			
-- Waste processing					
and storage	-- " IX	" " "			

3. However:--

-- The Committee has found that the Advisory Committee on Programme Management functions particularly satisfactorily with regard to the reactor safety programme;

- It considers it necessary to be able to follow up the short-term development of the hydrogen production programme in association with the specific ACPM. In the meantime, it feels that work in 1974 must not exceed that performed in 1973.
  
- It suggests that the results of the studies on raw materials recycling to be conducted by the CREST should be awaited before it expresses an opinion on the programme, and in the meantime the team of JRC specialists should be placed at the disposal of this Committee. Any programme of experiments should only be carried out in the light of the conclusions of the CREST after a re-examination of the role of the GAC before the end of 1974.
  
- With regard to the fusion reactor programme, the Committee stresses the need to conduct the studies strictly within the terms of reference adopted by the liaison group and under the supervision of this group. By the same token, it also feels it desirable that, starting from the next five-year programme on fusion, the JRC's studies should be financed under this programme.
  
- The Committee emphasised, with regard to the measures to be taken after the closing-down of the Ispra-1 reactor, that the JRC's obligations in respect of the installation and operation of the Euracos facility at Pavia and of a pneumatic installation in the Epsilon reactor must not exceed the budgetary limits proposed by the JRC and that the resultant medium-term commitments must be stated precisely.

4. On the other hand, the Committee feels that it needs more information on solar energy and therefore recommends that an ad hoc meeting be held of experts from all circles concerned in the Community in order to formulate a technical opinion on the JRC's proposals. In the meantime, the relevant activities would have to be maintained at their present level.

The Committee expresses serious doubts on the new programme for the Patten establishment and feels unable at the present time to form a favourable opinion, particularly on the part concerning the Administration of the customs union, as a result of the contacts between certain members and their customs administrations or other organizations concerning customs problems. As regards "carbon", the Committee suggests that the Commission should hold a meeting of an ad hoc group comprising representatives from the Member States.

However, the Committee appreciates the urgent need to find a solution to the problem of keeping the Establishment open. It recommends that alternative solutions should be sought.

Some members of the Committee suggest that the Establishment should participate in the "fusion reactors" programme.

6. The Committee wishes to stress that, after a more detailed examination of the programme objectives which have not yet formed the object of a proposal for a revision (in collaboration with the relevant ACPM's), it might be desirable to make amendments which could come into force at a later date.

An ad hoc group would have to be formed for the supervision and management of the fissile materials programmes.

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7. The Committee draws attention to the importance which it attaches to the activities of the various Advisory Committees on Programme Management, the setting-up of which and the opinions rendered by them must be effected quickly.

Opinion of the Scientific and Technical Committee

1. During its meetings held on 27 February and 29 March 1974, the Scientific and Technical Committee noted the draft revision of the multiannual programme for the JRC. It issued a favourable overall opinion on the nuclear programme (Article 7 of the Euratom Treaty) but wished to make certain comments on the following projects :

Safety

The Committee is very pleased to note the expansion of this programme but recommend that particular care should be devoted to the integration of the relevant theory and experiments.

Hydrogen

The Committee hope that particular attention will be paid to the laying-down of criteria for the selection of cycles. It also hopes that the necessary resources will be called into action in this area in order to provide the greatest amount of liaison possible with the industrial objectives can be formulated as quickly as possible.

Education and Training

This project was not examined in detail, although the Committee fully acknowledged its importance.

General comment

The Committee did not feel obliged to express an opinion on Chapter X (Petten) because of its non-nuclear nature. In any case, the Committee would like to be kept informed and to have the opportunity of adopting a standpoint in good time even on the items which have not been discussed in detail.

2. The Committee also expresses its agreement on the plutonium recycling programme but insists on the importance which it attaches to the definition of the standards for safety regulations and to the use of the basic data enabling them to be drawn up. The Committee also wishes to be informed as quickly as possible of the conclusions reached by the group of experts which is to examine "the promotion of a concerted policy for recycling on a Community scale".



COM(74) 500 final

ANNEXES

The annexes of doc COM(74) 500 final  
will be diffused separately.

COM(74) 500 final

ANNEXES