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Working Documents

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Report

drawn up on behalf of the Committee on Energy,
Research and Technology

on the proposals from the Commission of the
European Communities to the Council concerning

I. a decision adopting a programme of research on
the decommissioning of nuclear installations
(1984-1988) (Doc. 1-524/83 - COM(83) 298 final)

II. a decision adopting a research programme on
reactor safety (1984-1987) (Doc. 1-528/83 -
COM(83) 299 final)

and on the communication on a research action programme
on the development of nuclear fission energy (1984-1987)
(Doc. 1-457/83 - COM(83) 300 final)

Rapporteur: Mr Y. GALLAND

PE 86.679/fin.

By letter of 1 July 1983, the President-in-Office of the Council of the European Communities requested the European Parliament to deliver an opinion on the proposals from the Commission of the European Communities to the Council concerning Council decisions adopting a second five-year programme of research on the decommissioning of nuclear installations (1984-1988), a research programme on reactor safety (1984-1987) and a communication on a research action programme on the development of nuclear fission energy (1984-1987).

On 6 July 1983, the President of the European Parliament referred these proposals to the Committee on Energy, Research and Technology as the committee responsible and to the Committee on Budgets for its opinion; Doc. 1-524/83 was referred to the Committee on the Environment, Public Health and Consumer Protection for its opinion.

On 21 June 1983, the Committee on Energy, Research and Technology appointed Mr GALLAND rapporteur.

The committee considered the Commission's proposals and the draft report at its meetings of 20 September, 30 September and 17 October 1983.

At the last meeting, the committee decided by 19 votes to 2 with 1 abstention to recommend to Parliament that it approve the Commission's proposal without amendment.

The committee then adopted the motion for a resolution as a whole by 19 votes to 2 with 1 abstention.

The following took part in the vote: Mrs Walz, chairman; Mr Seligman, vice-chairman; Mr Ippolito, vice-chairman; Mr Galland, rapporteur; Mr Damette (deputizing for Mr Wurtz), Mr Fuchs, Mr Ghergo (deputizing for Mr Sassano), Mr Giummarra (deputizing for Mr Pflimlin), Mr K.H. Hoffman (deputizing for Mr Pedini), Mr Lima (deputizing for Mr Protopapadakis), Mr Linkohr, Mr Moreland, Mr Normanton, Mr Peters (deputizing for Mr Markopoulos), Mr Petersen, Mrs Phlix, Mr Pintat, Mr Purvis, Mr Rinsche, Mr Rogers, Mr Sälzer, Sir Peter Vanneck, Mr Veronesi and Mrs Viehoff (deputizing for Mrs Lizin).

The opinions of the Committee on Budgets and the Committee on the Environment, Public Health and Consumer Protection will be published separately.

This report was tabled on 24 October 1983.

C O N T E N T S

	<u>Page</u>
A. MOTION FOR A RESOLUTION	5
B. EXPLANATORY STATEMENT	7
Annex	16

The Committee on Energy, Research and Development hereby submits to the European Parliament the following motion for a resolution together with explanatory statement:

MOTION FOR A RESOLUTION

closing the procedure for consultation of the European Parliament on the proposals from the Commission of the European Communities to the Council concerning

- I. a decision adopting a programme of research on the decommissioning of nuclear installations (1984-1988)
- II. a decision adopting a research programme on reactor safety (1984-1987)

and on the communication on a research action programme on the development of nuclear fission energy (1984-1987)

The European Parliament,

- having regard to the proposals from the Commission to the Council (COM(83) 298 final)¹, (COM(83) 299 final)², (COM(83) 300 final),
 - having been consulted by the Council (Doc. 1-524/83), (Doc. 1-528/83), (Doc. 1-457/83),
 - having regard to the report of the Committee on Energy, Research and Technology and the opinions of the Committee on Budgets and the Committee on the Environment, Public Health and Consumer Protection (Doc. 1-935/83),
 - having regard to the result of the vote on the proposals from the Commission,
1. Welcomes the attitude of the Commission, which, as part of its objective of nuclear energy development, has adopted an approach based on safety, health and environmental protection;
 2. Approves the guidelines for Community research in this area, as concern for safety problems should make it possible to seek a consensus on this matter;
 3. Welcomes also the fact that the Commission has decided to continue its efforts on the decommissioning of not only nuclear power stations but also all nuclear installations;

¹ OJ No. C 178, 5.7.1983, p.6

² OJ No. C 250, 19.9.1983, p.6

4. Considers that the breakdown of programmes into direct actions carried out in the laboratories of the JRC and shared-cost actions should ensure the revival of Community research whilst avoiding the management problems exemplified by Super-Sara;
5. Hopes that the Commission will complete its action programme by including:
 - research into a simulation code for loss-of-coolant accidents (e.g. Cathare code, SSYST code);
 - research into the monitoring of fission product discharges during an accident (e.g. Piteas programme, CORA programme);
 - research into the risks of using sodium in fast reactors (e.g. Esmeralda installation, Fauna installation);
 - research under the Cabri programme on breeder reactor core accidents;
6. Calls on the Commission to propose a shared-cost action on safety/criticality studies;
7. Regrets, however, that the Commission does not anticipate more often the technological needs in the field of research;
8. Calls on the Council to take early decisions so as not to delay the implementation of the shared-cost action programme or cause problems for the direct action programme;
9. Instructs its President to forward to the Commission and the Council the proposals from the Commission as voted by Parliament and the corresponding resolution as Parliament's opinion.

EXPLANATORY STATEMENTResearch action programme on fission energy

In particular: reactor safety
decommissioning of installations

1 - INTRODUCTION

1. The Commission's research action programme on the development of nuclear fission energy was forwarded to the Council on 28 May 1983.

This action programme must be examined in the context of the energy situation, in particular nuclear power, in the Community.

In 1982, for example, nuclear-generated electricity accounted for 18.9% of total electricity production in the Community, an increase of 12% compared with 1981.

As at 31 December 1982 there were 86 installed power stations in operation in the Community and 60 under construction
(source: Nuclear News, February 1983)

Country	Number installed	Under construction
Federal Republic of Germany	12	16
Belgium	4	3
France	32	29
Italy	3	3
Netherlands	2	0
United Kingdom	33	9
Total	86	60

Percentage share of nuclear energy in the total electricity production of the various Member States:

1982	Germany	France	Italy	Netherlands	Belgium	United Kingdom
	17.4%	38%	3.7%	6.4%	30.8%	15.2%

These figures have to be seen against the following situation worldwide, (situation as at 31 December 1982, figures published by Nuclear News, February 1983).

Country or group of countries	Number installed	Under construction
European Community	86	60
United States	77	70
COMECON	45	34
Rest of the world	66	75
Total	274	239

2. Thus, to improve the management of resources and reduce energy dependence, the Commission proposes to focus its efforts for the period 1984-1987 on the following four scientific and technological objectives: the rational use of energy, the development of renewable energies, controlled thermonuclear fusion and the development of nuclear fission energy. The broad lines of the action programme on the development of nuclear fission energy which forms the subject of the present proposal are described in COM(82) 865 final as follows:

3. 'The development of nuclear fission energy is one of the main ways of reducing, through the diversification of energy sources, the Community's dependence on oil. The continuation of a resolute nuclear programme is therefore an essential aspect of European energy policy. The Community strategy provides for the consolidation and intensification of research activities, in particular in the general fields of nuclear safety, health and environmental protection, and fissile materials safeguards. The European Parliament has adopted a resolution approving and confirming this strategy upon which the Council also took a favourable position. It should also be recalled that the nuclear option embraces the development of the entire fuel cycle, including reprocessing and fast reactors. It is with this in mind that the present guidelines for Community R&D have been drawn up.

4. Community R, D&D activities will therefore be mainly directed towards the safety aspects, i.e. the protection of workers and the general public against nuclear hazards. In this manner Community research can exert a positive influence on the nuclear controversy, by providing objective information that transcends the national dimension. By helping to

harmonize national approaches to safety, Community action also assists in promoting industrial competitiveness by reducing the barriers to intra-European trade.

5. At international level, there is an increasingly marked tendency to cooperate in the general field of nuclear safety, a trend which is considered extremely favourable for the development of this energy source and will be taken into account by Community action.

6. The main areas taken into consideration are reactor safety, the management and storage of radioactive waste, radiation protection, fissile materials safeguards, the decommissioning of nuclear plants, and - in the remainder of the fuel cycle that has already reached the industrial stage - certain safety aspects which call for Community action.'

7. This Commission action programme is in line with the policies repeatedly advocated by the European Parliament's Committee on Energy which are the subject of highly topical discussions (for example, the LIZIN report on nuclear safety, PINTAT report on the nuclear aspects of a Community energy strategy, SELIGMAN report on breeder reactors).

8. Thus, an objective defined by Mr LINKOHR in his draft report on the future tasks of the JRC has largely been achieved: 'If one wished to describe its future role more precisely, safety could well serve as the overall concept... It comprises the development of technical standards and devices to protect man and his natural environment from the dangers resulting from the use of modern technology'.

9. It is, however, surprising that the question of fuel reprocessing does not form part of the Commission's action programme. In this respect, Mrs WALZ's report on the 'need for Community measures for the final storage of radioactive waste and the reprocessing of irradiated nuclear fuels' has come at the right time. On the basis of the WALZ report, it would be useful if, in the present report, the Commission were asked to extend the scope of its framework programme to include the problems of fuel reprocessing. This is, admittedly, a delicate subject and no Community compulsion would be accepted at the present time. The Community nevertheless has a natural duty, either through direct action or shared-cost action, to further research in this area.

11 - THE COMMISSION'S MAIN GUIDELINES

10. Of the five main areas covered by the Commission's proposals, this report is concerned principally with reactor safety and the decommissioning of nuclear

installations.

General comments

11. It is gratifying that the Commission appears to have learned from the unfortunate experience of the JRC. The policy therefore consists in

- undertaking direction action only for activities on which there is broad agreement;
- developing shared-cost actions which
 - further research in those areas where it is most advanced,
 - make optimum use of Community resources
 - give the 10 countries of the EEC the benefits of the results obtained.

12. It has to be noted, however, that shared-cost action is most effective in an area where there has already been national investment. It is to be regretted that the Commission does not take the initiative more often in making forward-looking proposals on new systems which would thus justify the establishment of Joint Research Centres about whose efficiency there would be little or no doubt.

III - REACTOR SAFETY

13. This is the largest sub-programme and involves both direct action by the Joint Research Centre and shared-cost action. It forms part of the objective laid down for the option 'improving living and working conditions' and in particular 'improving safety and protecting health and the environment and promoting industrial competitiveness'.

14. This action covers both light-water reactors and fast reactors. Expressed as constant ECU, the budgets are 192.2 m ECU for the direct action on fission reactors and 68 m ECU for the shared-cost action programme (81.3 in actual ECU), giving a total of 260.2 m ECU.

15. The objectives and, therefore, the budget of the shared-cost action have nothing in common with the previous programme, since the budget is multiplied more than tenfold (old budget 6.3 m ECU).

16. However, the changes in the Super-Sara programme and the resultant savings on direct action largely offset this increase. The overall budget will therefore change only slightly.

17. It should be noted that the breakdown of the 68 m ECU of the shared-cost action expressed in actual ECU, i.e. 81.3 m ECU, will be as follows:

44.7 m ECU for light-water reactors
29.9 m ECU for breeder reactors,

whereas the previous programme under way since 1973, on a much smaller scale of course, dealt only with light-water reactor safety.

18. Finally, it has to be said that this programme proposal has not been put forward to compensate for the abandonment of Super-Sara; it was drawn up before the decision to discontinue Super-Sara because it filled a need.

19. The topics covered include:

(a) human factors and man-machine interaction

This new action is particularly noteworthy for the Community, inasmuch as we now know the part played by the 'human factor' in the Three Mile Island accident;

(b) behaviour of the core and reactor cooling system

Under severe accident conditions, which was the original purpose of Super-Sara and will henceforth be

- limited to certain areas covered as part of the direct action at ISPRA;
(Analysis of in-pile data. Development of calculation models and tools. Specific experimental (out-of-pile) support;
- on a shared-cost basis for that area no longer studied at ISPRA, with centres located for the most part outside the Community (Sweden, United States, Canada). The possibility of participation in a full test programme carried out in Europe (Phébus) is also envisaged in this framework.

It is regrettable that the Commission makes no reference to the question of codes to simulate loss-of-coolant accidents, such as the Cathare code. These 'second-generation' codes are great improvements over the 'first-generation' codes and will enable the development of a loss-of-coolant accident to be represented in real time;

(c) phenomena affecting the reactor outer containment during a severe accident

As direct action, experiments on hydrogen combustion studies will be

carried out within the 100 m³ vessel at ISPRA. As a shared-cost action there will be cooperation with national bodies on experimental and analytical work (flammability limit of the combustion process, attenuation of the effects of hydrogen combustion, etc.);

- (d) Fission product dispersion in the atmosphere, for which all proposed Actions will be on a shared-cost basis. This is important, as the consequences of an accident depend on the extent of the radioactive discharge from the installation. One of the essential problems is what happens to the radioactive products, particularly iodine and cesium which are the most noxious for the environment.

In France, the PITEAS programme is devoted specifically to tests designed to study the behaviour of aerosols and the use of a system of filtration making it possible to monitor and film the discharges during the accident should the pressure in the containment become too high. It would be useful for the Commission to consider combining with this PITEAS programme as part of a shared-cost action;

- (e) Fast breeder reactor safety

this, it may be recalled, is a new action in which some Community countries have established unique technical facilities (example, start-up of Super Phénix in 1984). The objectives set out by the Commission in this connection are:

- reactor core and cooling system,
- analysis of severe accidents,
- integrity of structures subjected to dynamic stresses,
- behaviour of the outer containment in an accident.

The problem of fast reactor safety is the use of sodium and the risk of sodium fires. The Commission makes no mention of the work of the Franco-Italian facility Esmeralda with which it could also consider an association.

As in the case of Phébus for light-water reactors, there is a reactor Cabri on which research on breeder reactor core accidents is already at an advanced stage.

Italy, Germany, Belgium, the Netherlands, the United Kingdom and the United States are participating in this project. One may ask why the Community is not also participating in the Cabri programme as part of

its shared-cost actions.

The Commission also talks about continuing the development of one of the fuel behaviour codes with a view to integrating it into the European accident code now under development at Ispra.

There is also an accident code within the Cabri reactor programme. It should, therefore, be ensured that the research carried out at Ispra is complementary to the other research and does not duplicate it. On the other hand, it is to be welcomed that the Commission proposes a series of experiments, as part of the Scarabée reactor programme, on fuel assembly accidents.

It may be regretted that the Commission has not proposed a shared-cost action as part of the safety/criticality studies, i.e. a divergent chain reaction. The MARACAS facility and the Silené reactor in France are devoted to the study of this criticality risk. The Commission could therefore participate in such programmes as part of shared-cost actions.

111 - CONCLUSIONS

20. The topics chosen in this shared-cost research programme on reactor safety seem such as to interest European organizations and laboratories. The Commission's experience in the implementation of the first indirect action programme on thermal reactor safety has undoubtedly enabled it to make the selection.

21. It would be desirable, however, if it would state how it carries out the contracts.

It is in any case essential, in terms of the budget, for these contracts not to go the way of other contracts in the energy sphere and therefore for the carryovers of payment appropriations not to be abnormally high.

IV - DECOMMISSIONING OF NUCLEAR INSTALLATIONS

22. This is an old problem which has formed the subject of a first programme, but which is becoming of practical topicality. Whereas in 1978, when the first programme was implemented, only five nuclear power stations had been decommissioned, there are now ten or so.

Station	Country	System	MWe Capacity	Operation
HDR Grosswelzheim	D	boiling water	25	1970 to 1972
KKN Niederaichbach	D	heavy water/gas	100	1974
KRB Gundremmingen	D	boiling water	237	1966 to 1977
KWL Lingen	D	boiling water	240	1968 to 1977
G1 Marcoule	F	graphite/gas	4	1956 to 1968
Chinon 1	F	graphite/gas	70	1963 to 1973
G2 Marcoule	F	graphite/gas	40	1959 to 1980
Garigliano	I	boiling water	160	1964 to 1978
DFR Dounreay	UK	fast neutron	15	1963 to 1977
WAGR Windscale	UK	graphite/gas (advanced)	30	1963 to 1981

23. In the next ten years, on the basis of a station operating life of 30 years, it is estimated that 20 to 25 reactors will be finally shut down in the European Community.

24. This figure gives a better idea of the value of the Commission's new programme.

Note must also be taken of the success of the previous programme which formed the subject of 22 contracts concluded with industry, 18 with public organizations and 8 with electricity producers in France, Germany, the United Kingdom, Italy and Belgium.

25. The purpose was to collect and analyse information on the design and operation of nuclear power stations with a view to facilitating the decommissioning, as well as dismantling techniques.

26. The new programme has been extended to all nuclear installations, including reprocessing plants and fuel production plants.

27. This new approach is to be welcomed. It should help to develop the

basis for a Community policy in this sphere, which is the necessary corollary to the development of nuclear energy.

28. The budget of 12.1 m ECU with a staff of 5, as envisaged by the Commission, is therefore perfectly justified.

RDD FISSION - 1982 (in M. \$)
 (IAE data - excluding France)

	FISSION (excluding BREEDER)	BREEDER	TOTAL
B	21	26	47
DK	1	0	1
D	550	293	843
GR	0	0	0
IRL	0	0	0
I	220	213	493
NL	17	33	50
UK	135	151	286
	-----	-----	-----
	944	716	1,660
F (estimate)	-----	-----	-----
	450	350	800
TOTAL EEC	1,394	1,066	2,460
	~ 35% of total RDD 'Energy'	~ 25% of total RDD 'Energy'	~ 60% of total RDD 'Energy'

USA	534	647	1,181
	~ 20% of total RDD 'Energy'	~ 24% of total RDD 'Energy'	~ 44% of total RDD 'Energy'

JAPAN	615	215	830
	~ 45% of total RDD 'Energy'	~ 16% of total RDD 'Energy'	~ 61% of total RDD 'Energy'

Community nuclear action programme

Average annual figure for the period 1984 - 1987: $\frac{477.5}{4} \approx 119\text{m ECU} = \130m (1983 values). This is about 5% of the total RDD on fission in the EEC and about 27% of the total for RDD Energy in the Commission's framework programme.