

# COMMISSION OF THE EUROPEAN COMMUNITIES

COM(78) 147 final.

Brussels, 7 April 1978.

APPROVAL OF THE CONSTRUCTION PHASE  
OF THE JET PROJECT  
AND  
PROPOSAL FOR A COUNCIL DECISION  
TO INCLUDE THE JET PROJECT  
IN THE FUSION PROGRAMME

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(forwarded by the Commission to the Council)

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1. EXPLANATORY MEMORANDUM

1.1 Background

On July 31 1975 the Commission presented to the Council a proposal for a multiannual programme (1976-1980) of the European Atomic Energy Community in the field of controlled thermonuclear fusion and plasma physics (Fusion Programme) including the construction and initial operation of a large Tokamak-type torus device (Joint European Torus - JET). (1)

This proposal has been endorsed by the European Parliament (2) and by the Economic and Social Committee. (3)

On 25 March 1976 the Council adopted the Fusion Programme (1976-1980), excluding the JET Project. (4)

On 14 July 1976 the Council had an exchange of views on the JET research programme relating to controlled thermonuclear fusion and formed a favourable opinion on the rapid implementation of the project under the Community's multiannual research and training programme (1976-1980).

On 6 October 1976, the Commission presented the Council with a proposal for a Council decision aimed at implementing the JET Project within the 1976-1980 Fusion Programme. (5) The Commission proposed, among other things, to establish, for the implementation of the Project, a Joint Undertaking in the sense of Chapter V of the Treaty setting up EURATOM.

On 17 October 1977 the Council approved the "Arrangements for Implementing the JET Project" (6) and on 25 October 1977 decided that the JET Project should be sited at Culham. (7)

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(1) O.J. N° C 201 of 3 September 1975.

(2) O.J. N° C 7 of 12 January 1976.

(3) O.J. N° C 35 of 16 February 1976.

(4) O.J. N° L 90 of 3 April 1976.

(5) Doc. COM(76) 523 final

(6) Doc. R 2404/77 (ATO 116) (Annex)

(7) Doc. R/2943/77 (ATO 126)

The Council accepted the proposal of the Commission to institute a Joint Undertaking, for the implementation of the JET Project, and an Interim JET Council has been set up which has unanimously approved the draft Statutes of such a Joint Undertaking.

On the basis of the proposed programme presented to the Council on 31 July 1975, and the guidelines given by the Council, the Commission presents to the Council herewith :

the request for approval of the construction phase of the JET Project and a proposal for a Council Decision to include the Project in the Fusion Programme; these proposals replace the proposal presented by the Commission to the Council on 6 October 1976.

#### 1.2 Description, duration and global cost of the JET Project.

- a) The JET Project consists of the construction, the operation and the exploitation, as part of the Community Fusion Programme and for the benefit of the participants in this programme, of a large torus facility of Tokamak type and its auxiliary facilities (Joint European Torus - JET) in order to extend the parameter range applicable to controlled thermonuclear fusion experiments up to the conditions close to those needed in a thermonuclear reactor.

A detailed description of the Project is given in the report EUR-JET-R5 'The JET Project - design proposal', drawn up by the Design Team and approved by all the partners associated with the Fusion Programme.

- b) Two distinct phases appear during the development of the Project :
- the construction phase
  - the exploitation phase,

it being understood that, as in all large scientific/engineering projects of this type, there will be a certain overlap of the two phases.

The construction phase, well defined in all its details, will extend up to the middle of 1983 and will cover the actual building of JET, its commissioning and the beginning of its exploitation within its basic performance. The cost of this phase is put at 7500 MFB at January 1977 prices.

The exploitation phase for which the detailed arrangements will be defined in relation to the progress of the Project will probably extend over a period of 5-7 years beyond the construction phase. It is estimated that the annual cost of the Project during this second phase will be similar to that of the first phase.

### 1.3 Decisions requested

- a) The Council is requested to approve the construction phase of the Project as it is defined in paragraph 1.2.b) above.

It is recalled that the sum 7500 MBF does not include the cost of the investments necessary to allow this device to reach its extended performance during the exploitation phase. It is probable that part of this expenditure will need to be committed during the second half of the construction phase. It is understood that this additional expenditure can only be committed on the basis of a new programme decision by the Council.

- b) Because the JET Project forms part of the Fusion Programme, the proposal for a decision presented below aims to include the project in the Fusion Programme during 1976-1980. This programme covers approximately the first half of the construction phase.

The second half of the construction phase, comprising the completion of the construction of JET and its auxiliary facilities, its commissioning and its initial operation within its basic performance, will be included in the new programme for 1979/83 for which the Commission will submit a proposal this year in accordance with Article 3 of the Council Decision of 25 March 1976 (76/345 EURATOM).

1.4 Financial Allocations of the JET Project

The table below summarizes the incidence of project costs on the Community budget :

	Evaluation at January 1977 prices  (MFB)	Conversion in UA (1 UA=50 FB)  (MUA)	Conversion in EUA at the rate of 3.1.77 (1 EUA=40,6207 FB)  (MEUA)	Participation of the Community  (MEUA)	Remarks
Total cost of project in the construction phase (see (a) below)	7500	150	184.635	147.7	
Cost of pro- ject during 1st half of construction phase (see (b) below)	5200	104	128	102.4 see (c) below	Amount to be included in the 1976/80 Fusion Programme
remainder of cost relative to the const- ruction phase	2300	46	56.635	45.3	Amount to put into the new quinquennial programme 1979/83

- (a) The cost of the project in the construction phase has been calculated in Belgian francs and put at 7500 million Belgian francs at January 1977 prices. On the basis of a conversion rate of 1 UA = 50 BF applicable at that time to the European Community budget, this sum is equivalent to 150 MUA. However, this budget being established in European units of account (EUA) since 1st January 1978, this sum represents 184.6 MEUA at the rate of the EUA on 3 January 1977 (1 EUA = 40.6207 BF).
- (b) During the first half of the construction phase covered by the 1976/80 programme almost all the orders for the supply of components of the machine will have been placed with industry. This requires the commitment of a large proportion of the total cost of the construction phase, estimated as 5200 million Belgian francs at January 1977 prices, a sum equivalent to 128 MEUA at the EUA rate of 3 January 1977.
- (c) The sum of 102.4 MEUA includes the 4 MUA released for the project on 4 October 1976. These funds have been utilized to cover the expenses incurred by the project as a charge to the Community from 1 January 1976 to the extent that these exceeded the funds allocated to the project during the previous programme 1971-75. Payments made before 1 January 1978 have been accounted on the basis of the old conversion rate of the Unit of Account and must be charged to the project at that rate.

1.5

Financial allocation to the Fusion Programme excluding JET

It will be recalled that the financial allocation of the Fusion Programme excluding JET amounts to 124 MUA. So as not to prejudge either the decision which the Council is called upon to make on the conversion into EUA of the programme allocations established in UA, or the revision of the Fusion Programme according to Article 3

of the programme decision of 25 March 1976, the Commission proposes, below, the inclusion the JET Project in the current programme by means of a complementary decision not affecting the initial decision on the Fusion Programme excluding JET.

1.6

#### Staff

In order to guarantee that the project effectively presents a Community character, the members of staff assigned to the JET team will, in principle, be recruited by the Commission as temporary agents, with the exception of staff assigned to the project by the host organisation who will retain their existing status.

To this end, the Commission is requesting the additional allocation to the Programme of a maximum of 150 temporary staff within the meaning of Article 2.a) of the Conditions of Employment of Other Servants of the European Communities.



2. PROPOSAL FOR A  
COUNCIL DECISION  
OF .....

amending Decision 76/345/EURATOM  
adopting a research and training programme (1976/1980)  
of the European Atomic Energy Community in the field  
of fusion and plasma physics

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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 submitted after  
consultation with the Scientific and Technical Committee,

Having regard to the opinion of the European Parliament,

whereas the Council has adopted, by Decision 76/345/EURATOM, a research  
and training programme (1976-1980) in the field of fusion and plasma  
physics ;

whereas it is necessary to equip the Community with a large Tokamak-type  
device (JET - "Joint European Torus") ;

whereas, it is therefore necessary to provide adequate additional resources for this programme as far as the implementation of the JET Project is concerned, so as to ensure continuity of this programme, which, moreover comes within the more general context of security of Community energy supplies in the long term,

whereas, by virtue of Article 3 of the Council Decision 76/345/EURATOM, the Commission will submit to the Council in 1978 a review proposal designed to replace the present programme with a new five-year programme as from 1 January 1979, which will include the continuation of the JET project.

HAS DECIDED AS FOLLOWS :

#### Article 1

Article 2 of the Council Decision 76/345/EURATOM is completed by the following paragraph :

"In addition to the appropriation and the staff shown in the first paragraph, the total amount of commitments of expenditure required for the implementation of the JET Project is estimated at 102.4 millions of European Units of Account, this Unit of Account being defined in Article 10 of the Financial Regulation of 21 December 1977 applicable to the general budget of the European Communities (1), and the staff required for this project is estimated as 150 temporary staff in the sense of Article 2.(a) of the Conditions of Employment of Other Servants of the European Communities.

#### Article 2

The Annex to the Council Decision 76/345/EURATOM is completed by a new paragraph 6, worded as follows :

"6. The programme defined above is completed by the implementation of the JET Project to which is allocated a total sum estimated at 102.4 millions of European Units of Account and a Staff of 150 temporary agents.

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(1) J.O. n° L 356 of 31.12.1977

The sum indicated is to finance the first half of the construction phase of the JET Project with a participation rated at 80 %.

Done at Brussels, the .....

For the Council

For the President

FINANCIAL RECORD

1. RELEVANT BUDGET HEADING CODE: 3351
2. TITLE OF BUDGET HEADING: Fusion and plasma physics (including the JET project). This Record concerns only the JET project.
3. LEGAL BASIS: Article 7 of the EAEC Treaty  
Council Decision anticipated for May 1978.
4. DESCRIPTION, OBJECTIVE(S) AND JUSTIFICATION OF THE PROJECT:

4.1 Description

Construction, operation and exploitation, as part of the Community's fusion programme and for the benefit of the participants in that programme, of a large torus facility of Tokamak-type and its auxiliary facilities (Joint European Torus - JET) in order to extend the parameter range applicable to controlled thermonuclear fusion experiments up to conditions close to those needed in a thermonuclear reactor.

4.2 Objective

To obtain and study a plasma in dimensions and conditions approaching those required for a thermonuclear reactor. This objective will involve four main areas of activity:

- (i) the evolution of plasma behaviour when the parameters approximate to the reactor model;
- (ii) plasma-wall interaction in such conditions;
- (iii) study of plasma heating;
- (iv) study of the production and confinement of alpha particles, and of resultant plasma heating.

4.3 Justification

The implementation of the JET project constitutes an essential step in the development of the Community's fusion programme. The final objective of this programme is to produce energy at competitive prices from nuclear fusion reactions between light atomic nuclei and, if this is feasible, to undertake jointly the construction of prototypes with a view to industrial scale production and marketing.

5. OVERALL FINANCIAL IMPLICATIONS OF THE PROJECT (for the whole of its expected duration) (in EUA)

5.0 In respect of expenditure (period 1976-1980)

5.0.0 Chargeable to the Community budget (80%) 102 400 000 EUA

Chargeable to national budgets and other sectors  
at national level (20%) 25 600 000 EUA

Total cost: 128 000 000 EUA

This cost has been evaluated at constant January 1977 prices.

5.0.1 Multiannual timetable

in million EUA

Category of expenditure in the Community budgets against which Euratom contribution is charged:	Years of programme		
	1976/77/78	1979	1980
Contracts (contribution to the JET Joint Undertaking):			
- Appropriations for commitment	16.000	48.000	38.400
		102.400 <sup>1</sup>	
- Appropriations for payment	9.600	28.000	40.000
		77.600 <sup>1</sup>	

<sup>1</sup> As shown in the Table annexed to this Financial Record, the budget appropriations available for 1978 amount to:

- 89.933 million EUA in appropriations for commitment and
- 35.551 million EUA in appropriations for payment.

5.0.2 Method of calculation

	Evaluation at constant January 1977 prices m FB	Conversion into u.a. (1 u.a. = Bfrs 50) (m u.a.)	Conversion into EUA at rate of 3 January 1977 (1 EUA = Bfrs 40.6207) (m EUA)	Community contribution = 80% (m EUA)	Remarks
Total cost of project in construction phase	7 500	150	184.635 <sup>1</sup>	147.7	
Cost of project during first half of construction phase	5 200	104	128	102.4	Amount to be included in Fusion Programme 1976/80
Balance of cost for construction phase	2 300	46	56.635	45.3	Amount to be entered in new five-year (1979-1983) programme

1 (a) This amount does not include the cost of investments necessary to enable the installation to achieve its extended performances in the operating phase. Part of this expenditure will have to be committed during the second half of the construction phase. It is understood that the commitment of such expenditure can only be made on the basis of a new programme decision by the Council.

The operational phase of the project will probably cover a period of 5-7 years beyond the construction phase. It is estimated that the annual cost of the project during this second period will be similar to that of the first period.

(b) The year-by-year breakdown of the 184.6 m EUA, evaluated at constant January 1977 prices, throughout the construction phase is expected to be as follows:

Year	1976/77/78	1979	1980	1981	1982	1983 first half	Total
Commitments (m EUA)	20	60	48	35	17	4.6	184.6
Payments (m EUA)	12	35	50	43	30	14.6	184.6

5.1 Implications in respect of revenue

Community taxes on salaries of temporary servants

6. FINANCING OF THE PROJECT

- Project financed from appropriations entered in the budgets of the European Communities for 1976, 1977 and 1978 (see annex).

- Appropriations to be entered in future budgets.

**Subject: Trend of JET appropriations**

- Annex to the financial record attached to the Commission proposals relating to implementation of the JET Project.

1976 Budget	Budget headings		Appropriations authorize 1976	
	1977 Budget	1978 Budget	AC	AP
Chapter 33 "Expenditure on research and investment"				
and - at the same time - Chapter 3.20 "Fusion and plasma physics" of Annex 1 to the Commission Budget	-	-	68.377 <sup>1</sup> of which, released 4.000 <sup>2</sup>	8.509 <sup>1</sup> 1.800 <sup>2</sup>
	Items:			
	3332 "Fusion and plasma physics - JET Project"	-	-	-
	3394 "Provisional appropriations for the project on "fusion and plasma physics" and - concurrently - Article 3.20.1 "Fusion and plasma physics - JET Project"	-	-	-
	Chapter 9.22 "Provisional appropriations for the project "Fusion and plasma physics" - JET Project" in Annex 1 to the Commission Budget	-	-	-
		Item 3351 "Fusion and plasma physics (including the JET Project)"	-	-
		Chapter 100 "Provisional appropriations"	-	-

<sup>1</sup>At the time of the adoption of the Budget for the financial year 1976, the European Parliament entered the following reserved appropriations in Chapter 33: 197.629 m u.a. in appropriations for commitment of which 68.377 for the JET Project and 30.000 m u.a. in appropriations for payment (of which 8.509 m u.a. for this project).

<sup>2</sup>Resolution of the European Parliament of 14 September 1976 (doc. 996/76-ASS 631-).

<sup>3</sup>Appropriations carried forward to the financial year 1977 (Council Decision of 17 October 1977 and Resolution of the European Parliament of 15 September 1977).



Appropriations authorized 1977		Appropriations authorized 1978		TOTAL		Remarks
AC	AP	AC	AP	AC	AP	
-	-	-	-	68.377 (-) 4.000	8.509 (-) 1.800	Appropriations used
-	-	-	-	64.377	6.709	
					(-) 4.509	Appropriations not used and cancelled at 31 December 1976. Appropriations carried forward to the financial year 1977 and used.
					(-) 2.200 <sup>3</sup>	
token entry	token entry	-	-	17.527		
17.527	20.551	-	-			
token entry	token entry	-	-			
17.527	20.551	-	-			Appropriations carried forward to the financial year 1978
-	-	token entry	token entry	token entry	token entry	
-	-	8.029	15.000	8.029	15.000	
Total appropriations available for 1978				89.933	35.551	