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COMMUNICATION OF THE COMMISSION TO THE COUNCIL

ON THE JET PROJECT

COM (76) 271

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Contents:

Introduction

1. In July 1975 the Commission submitted to the Council the Proposed Pluri-annual Programme of the Community for the years 1976/80 in the field of Controlled Thermonuclear Fusion and Plasma Physics. This proposed programme included the work, in association with the Commission, of all the laboratories of the member States active in this field as well as the construction phase of the JET project.

The Council, at its session of 15 December 1975, could not reach any decision on this proposed programme, due essentially to the difficulties connected with the choice of the site for the construction of JET.

In January 1976 the Commission submitted to the Council a Communication on the JET site in which after an analysis of all the aspects of the problem it pointed out that the site should be Ispra and asked the Council to take a position on this choice.

The Council, at its session of 24 February 1976, did not take any position on the choice of the site made by the Commission and did not approve the JET project. It approved for a period of five years the Community fusion programme with the exception of the JET project on the basis of an overall budget of 124 MUA, but provisionally restricted the implementation of this programme to 1976 with an appropriation of 20.8 MUA pending a final decision on the JET project. At the same session the Council agreed on Friday 18 June as the date for its next meeting to be given over to further examination of the Commission proposals on the JET project and its communications on siting.

2. During the Council sessions of 15 December and 24 February, and during the preceding discussions, concern has been expressed on the scientific objectives on the technical and financial aspects and on the management structures of the project. The Consultative Committee for Fusion discussed all these matters at the request of the Commission during its meetings of 5 April and 17 May 1976 and adopted unanimously the Opinion which is given in the Annex.

The Commission had agreed to provide further and up-to-date information on these matters, and is accordingly submitting this document to the Council.

Chapter I : SCIENTIFIC STATUS

1. The essential objective of JET is to obtain and study a plasma in conditions and dimensions approaching those needed in a thermonuclear reactor. This objective involves four main areas of work :

(i) The scaling of plasma behaviour as parameters approach the reactor range

(ii) the plasma-wall interaction in these conditions

(iii) the study of plasma heating and

(iv) the study of alpha-particle production, confinement and consequent plasma heating.

In the conceptual design phase it was assumed that the induced current is the figure of merit of a tokamak. For a given cost and stress limit in copper, this led to the following main characteristics of the device: large volume, low aspect ratio, relatively low magnetic field and D-shaped copper coils. It should be noted that this choice is compatible with the assumption of different hypotheses on the figure of merit.

2. Three large projects comparable to JET are in progress in the world : TFTR in the USA, T-20 in the USSR and JT-60 in Japan. Two of them (TFTR and JT-60) have adopted rather different options from JET : smaller volume, larger aspect ratio, higher magnetic field, circular stainless steel supported copper coils. The third (T-20) is more similar to JET although considerably larger. Some variations between experiments of this generation can be considered as an advantage for the world programme.

3. Such a large and expensive project, lasting 7 to 8 years from the beginning of design to the starting of operation has inevitably some inertia in particular in the definition of the main characteristics which cannot be changed without introducing several years of delay and large supplementary costs. All successive fluctuations in scientific opinions on the criteria for the choice between the main options cannot be fully taken into account. Consequently a maximum of flexibility must be allowed for in the design, and this was the case for JET from the very beginning of the conceptual design phase.
Due to the design choices made it is possible to operate JET in a wide range of plasma dimensions and in a variety of cross-sections: from circularity

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to rather pronounced ellipticity. In addition to the ability to utilize Neutral Injection and Radio Frequency Heating, provision has been made for the application of Adiabatic Compression Heating.

4. The main options of the JET design are based, as we have already said, on the hypothesis that the current is the figure of merit of a tokamak. The clarification of this assumption is one of the major aims of JET. The main uncertainties concern the validity of its extrapolation to plasma regimes expected in a thermonuclear reactor and impossible to achieve in the present generation devices. These uncertainties are connected in particular to the role of the impurities in the plasma and even more to the behaviour of the loss mechanisms.

The assumption of the current as the figure of merit leaves some freedom in the choice between large volume - low field and small volume - high field solutions.

5. The results obtained at the end of 1975 on the machines ALCATOR at the MIT (high magnetic field, large aspect ratio, small volume) and PULSATOR at Garching (low magnetic field, large aspect ratio, small volume) show that in a very clean plasma it is possible to increase considerably the plasma density n, without important changes in temperature and current. In these conditions the confinement time t increases too, so that the quality of the confinement defined as nt increases substantially. It is unclear whether the improvements in density and confinement are two consequences of a same cause or if the improvement of the confinement is a consequence of the increase in density. The latter hypothesis should suggest higher fields allowing higher densities, but the extrapolation of these phenomena to reactor regimes is far from being granted.
On the other hand preliminary results on T-10 (Moscow) which can be considered a scaled-up version of T-3 by a factor 2 in linear dimensions, show that operation with magnetic field and plasma parameters comparable with T-3 gives increased current and an improvement in confinement time by a factor 5. This improvement can be attributed to the increase in volume and consequently in current.

6. Although the first group of results mentioned in paragraph 5 might indicate that the magnetic fields of JET should be increased and the volume reduced, the preliminary results on T-10 support retention of the present design of JET.

In any case major changes on the project would involve the loss of two to three years and of several MUA. These disadvantages would be unavoidable, whereas any modest improvements in the expected performance would be hypothetical. Taking into account the clear advantage of some diversity in the working regimes of the next generation of tokamaks, one concludes that the parameters of JET should remain unchanged.

7. Discussion of the information mentioned under I-5 has brought increased attention to the problem of auxiliary heating to be applied to JET. More weight must be given to this problem, the solution of which is particularly the responsibility of the EUR-CEA and the EUR-UKAEA Associations.

It is possible that the installation of considerable auxiliary heating power (20-30 MW), initially foreseen for the second phase of the JET operation (extended performance, around 1983), will be needed already during the first phase (basic performance, around 1981), but it will be two to three years from now before this need can be assessed.

8. After re-examining the scientific aims of JET and the choice of its main parameters in the light of all up-to-date information, the Commission, supported by all its Partners, confirms that the JET design as defined in R5* is scientifically sound and well suited to its aims. Consequently, the Commission strongly recommends to go ahead with JET as it is, without delay.

* "The JET project design proposal" doc. EUR-JET-R5, which is summarized in the brochure "The JET project" doc. EUR-JET-R7.

Chapter II: TECHNICAL STATUS

1. One should first recall that in such **a project which is essentially an experiment one cannot define precise limits between the design, the construction and the operation phases. Some minor improvements to the design may be appropriate** during the construction and even during the operation phase.

2. The present status of different elements of the project is indicated in the **second** column of table I. **In** order of increasing completion, the indications given are:

not yet studied
conceptual design
design
final design
call for tenders ready
call for tenders sent
contract ready for signature
contract signed

Table I shows that the main components of the device, such as the toroidal coils, the mechanical structure and the vacuum vessel, are the most advanced. The fact that diagnostics, control monitoring and data acquisition and additional heating systems are less advanced is normal: these items take a shorter time to complete, or need not be ready until later.

Two items should by now be in a more advanced state: the buildings and the power supplies. According to the planning of the project these items are on the critical path: each month of delay in their completion entails a month of delay in the first operation of the device. On the other hand the state of their design is as advanced as it can be in the absence of a decision on the site.

3. The last statement is evident for the buildings. Concerning the power supplies, one should recall here that they are site-dependent, as is repeatedly stated in R5. **In fact the basic power supply scheme given in R5 and referred to under point 3 of table I is operational at any of the proposed sites, including the weakest from the electrical point of view. However, the final layout will depend on the JET site public network** characteristics. At ISPRA, for example, no flywheel motor generator set would be necessary. *

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*) During the second meeting of the Consultative Committee for Fusion (17 May 1976), the British **Member stated** that this applies now also to Culham.

4. In view of the size and complexity of JET all the partners including the Commission considered it prudent to ask for an independent appraisal of the technical aspects and cost estimates of the project. For this reason the JET Supervisory Board in May 1975 placed this task on the Engineering Division of the Reactor Group (Risley) of the UKAEA.

This group listed and discussed all foreseeable technical difficulties as existing at that time and produced a totally independent assessment of the project. Particular attention was devoted to the final period of operation of the device (under radio-active conditions) and to the related problems of remote maintenance and repair.

At the final consultation between the JET team and the Independent Assessment Team (IAT) in April 1976, the two parties jointly stated that "for the majority of the questions raised by the IAT the answers of the JET team were agreed to be adequate, taking into account also the progress in the design and development in the year since R5 was issued", and that "the relatively minor divergencies which remain after the discussions are more matters of opinion than factual differences".

The Consultative Committee for Fusion has expressed its satisfaction about the careful and independent assessment of the project produced by the IAT and about the outcome of the final consultation (see point b. of the ANNEX).

In the Commission's opinion, too, this represents a satisfactory outcome. The few points remaining open should be handled by the JET Management Committee as the project proceeds.

5. After examining the up-to-date technical status of the project and the results of the final confrontation between the JET team and the Independent Assessment Team, the Commission concludes that the project is technically sound and feasible. The present state of the design allows passing immediately to the construction phase, except for the power supplies and buildings which are on the critical path and whose design cannot be finalized as long as the site is undecided.

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TABLE I (i)

Items	Technical Status (March 1976) (see page 6)	Status of the cost estimate: Cost (MUA) March 1975	Status of the cost estimate: Basis of the estimate (see page 11)
1. JET Device			
Mechanical Structure	Final Design	2.8	Comparison
Toroidal Magnet	Contracts placed	7.7	3 Study contracts
Magnetic Circuit	Final Design	3.9	2 Study contracts
Poloidal Field Windings	Final Design	4.5	Comparison
	Copper conductors: contract placed		2 Study contracts
Vacuum Vessel	Call for tender sent	5.5	Rigid sectors: 3 Study contracts
	Contract placed		Bellows: 3 Study contracts
	Design		Ports, Limiters: Comparison
Miscellaneous, Transport		2.3	Estimation
Long Delivery Items (funds released during the design phase)		- 2.5	Devoted to study contracts and prototype work
20% Contingency		4.9	
Subtotal		29.1	
2. Auxiliary Systems			
Pumping System	Design	2.0	2 Study contracts
Cooling Systems	Design	0.6	Comparison
Assembly and Maintenance System	Design	1.4	50% on one study contract 50% on comparison

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TABLE I (ii)

Items	Technical Status (March 1976) (see page 6)	Status of the cost estimate: Cost (MUA) March 1975	Basis of the estimate (see page 11)
Additional Heating System (including its Power Supplies)	Conceptual Design	3.5	Comparison
20% Contingency		1.5	
Subtotal		9.0	
3. Power Supplies			
Toroidal Field PS (one static unit, one flywheel motor generator set)	(not yet site-optimized) Final design	8.1	4 Study contracts
Poloidal Field PS (one flywheel MG set, circuits)	Call for tender ready for MG sets	9.7	Idem plus comparison and estimation for the circuits
Auxiliary PS	Not yet studied	1.0	Estimation
20% Contingency		3.7	
Subtotal		22.5	
4. Control, Monitoring, Data Acquisition			
Computers and Peripherals	Conceptual Design	1.9	Comparison
Computer station and connections		1.0	Comparison
20% Contingency		0.6	
Subtotal		3.5	
5. Diagnostics (Basic)			
Subtotal	Only preliminary studies	3.5	Comparison
6. Operating Budget			
Subtotal		7.6	Estimation

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TABLE I (iii)

Items	Technical Status (March 1976) (see page 6)	Status of the cost estimate: Cost (MUA) March 1975	Status of the cost estimate: Basis of the estimate (see page 11)
7. Buildings			
Specific JET Buildings including 12% Contingency	Final Design (site independent parts)	15.3	1 Study contract
Rented Buildings		1.3	Estimation
Subtotal		16.6	
8. Manpower			
1224 Man/years		26.4	Average Euratom Salaries
18% Overhead Services		4.7	Comparison
Travel		0.8	Comparison
Subtotal		31.9	
9. Reserve		11.3	
GRAND TOTAL		135 MUA	

Chapter III : STATUS OF THE COST ESTIMATE

1. The cost of JET up to its basic performance was estimated at 135 MUA as indicated in R5. This was calculated at March 1975 prices in Belgian Francs using the free market exchange rates, and then converted to units of account according to the official rate : 50 BF = 1 UA.

   The basis on which the cost of each element is estimated, is given in the fourth column of table I.

   The meaning of the key words used is the following :

   Study contracts : completed joint feasibility and cost estimates studies performed in industry.

   Comparison : comparative estimates (sometimes extrapolated) based on similar equipment used within the associations or other organizations.

   Estimation : estimates from technical data and general experience.

   Concerning the third column of table I, the subtotals are the same that were given in the document R5 (page 566), with the exception of an increase of 1.3 MUA in the expenditure under the item Buildings, counterbalanced by a lower provision for the operation phase due to its shorter duration within the 76-80 programme, as a consequence of delays. The grand total of 135 MUA is unchanged.

2. The Independent Assessment Team originally estimated that the cost of the construction phase exceeded the JET team estimate (135 MUA) by 23 MUA. After discussion, the JET team and the IAT, during the final confrontation held on 29 and 30 April 1976, agreed the following joint statement : "The general discussions showed a very good agreement on costs and manpower. The cost estimate of the IAT for the construction of the project in 5 years as proposed in R5 exceeds the JET estimate by only 5 MUA. This difference is not significant.
   The IAT estimate of 6 years for the construction phase is due to a more cautious approach in which prototypes are completely tested before series production begins. This extra time will cost approximately an additional 6.5 MUA". The Commission points out that these discrepancies are covered almost exactly by the Reserve (item 9 of table I).

3. Concerning the cost of the operation phase, it can be reasonably foreseen that an operation period of 5 years, including shut-down times required to prepare for extended performance, will be needed to achieve the aims of JET stated in Chapter I. The staff during operation will be comparable in numbers to that working during the final year of construction. On this basis the personnel cost would be about 40 MUA.

   The capital cost of achieving the extended performance will be about 40 MUA as stated in R5. This includes the cost of supplementary auxiliary heating (15-20 MUA). As pointed out in I.7 of this document, the need will probably arise to commit some of this money during the 5 year programme but this need cannot be assessed now.

   The operating costs including tritium operation are estimated at about 50 MUA.

   One can tentatively conclude that, as is usual for experiments of comparable size, the annual operating cost is similar to the average annual construction cost.

4. The grand total of 135 MUA for the construction phase will certainly be affected by inflation.

   Concerning salaries, according to the hypothesis assumed in R5 (temporary Euratom positions at March 75), one can say that, on the basis of the scale of salaries approved by the Council in November 1975, the increase at April 76 would be about 4 MUA to be added to the 135 MUA.

   Concerning the other items, it is extremely difficult to give similar indications. On the one hand one can expect an increase of costs in general, and most contracts include inflation clauses. On the other hand the competition between different firms and some fluctuations in the prices of raw materials can result in a cost reduction for some items. The situation is best illustrated by Table II showing a comparison between initial estimates and offers from industry for the cases in which contracts are ready for signature or have already been placed.

5. After examining the present status of the project cost estimate, and the final position of the Independent Assessment Team, the Commission continues to accept the estimate of 135 MUA for construction based on March 1975 prices. Allowance must be made for the effects of variations in the economic situation. The only way to face this difficulty is to propose again to the Council to adopt a financing system taking into account, year by year, the economic situation, on the basis of proposals of the Commission with precise justifications.

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TABLE II

Items for which contracts are ready for signature or have been placed

Type of expenditure	Offer from Industry (MUA at stated date)		Estimates (MUA March 75)
Copper for toroidal coils	1.8	February 76	2.1
Manufacture of toroidal coils	3.6	April 76	4.9
Bellows	0.8	January 76	0.54
Copper for outer poloidal coils	0.3	March 76	0.5
	6.5 *		8.04

*) **The legal commitments of the Commission, in accordance with the decisions of the Council, cover only the purchase of prototypes for a total amount of about 1.2 MUA whilst the commitments of the contractors, corresponding to this total of 6.5 MUA, cover the supply of complete sets. All the contracts include inflation clauses.**

Chapter IV : THE ORGANIZATION AND MANAGEMENT OF THE JET PROJECT

1) General principles

The scientific and engineering complexity of JET, together with its size and cost, demand a strong but flexible form of management organization, in which decisions can be taken and executed without delays. This management should therefore have full financial and contractual, as well as technical and operational responsibility for the Project. Moreover, an effective and continuous interaction must be established between the Project and the associated laboratories who should be strongly involved in and committed to the Project and consider it as a common venture.

The JET Project will be clearly distinct from the host organization and its activities, and in the provision of administrative or other supporting services from the latter a clear interface must be defined in detail to avoid duplication and blurring of responsibility.

2) Management structure

The management structure has already been agreed by the Partners and the Commission, and includes representation of all Partners and the Commission at all levels of the management. A JET COUNCIL will be established for overall general management, a JET MANAGEMENT COMMITTEE will be responsible for the direct management.

There is a HEAD OF PROJECT with adequate delegated powers to direct the execution of the project, assisted by senior managers and the PROJECT TEAM. Both the JET Council and the Management Committee are being formed.

3) Legal form

To meet the requirements in point 1 utilizing the agreed management structure in point 2 several alternative legal forms of organization could be adopted. One is a JET Association formed by an Agreement signed by all Partners including EURATOM, legal acts being carried out by the latter on behalf of all the Partners. Another is to set up an independent legal entity for the JET Project which would itself carry out all the legal acts required.

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In accordance with the Commission choice of Ispra, the JET Association as described above is considered the most suitable form.

4) Budget

Whichever form of organization is selected,

a) the funds contributed by the Commission and the Partners, taken together, will form the JET Project budget to be at the disposal of the JET management, and to be managed independently from the budgets of the Commission and the Partners,

b) the FINANCIAL REGULATIONS applicable to the Project will include the authorities for commitments and payments within the budget, a budgetary control system, procedures for inventories and auditing, and procedures for awarding contracts to industry ensuring full competition on a Community basis.

5) Staffing

The Project Team will be composed of staff seconded by the host Partner, the other Partners, and coming from other sources.

The Commission proposes to recruit the staff of the Project Team as temporary agents of the Community to temporary posts.

6) Involvement of Industry

Industry will contribute to the project mainly under contracts awarded by the JET management for supply of materials and services, construction of buildings and components, etc. The involvement of inudstry in any consultant capacity must be a matter for consideration and decision by the JET management.

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Chapter V: URGENCY OF THE FINAL DECISION

1. It is fully recognized that each month of delay in the final decision including the site entails one month of delay in the first operation of the device. The design of at least two site-dependent elements of the project (buildings and power supplies) will be suspended as long as the site is unknown.
   It is possible to carry on some other work, but this will not reduce the final delay. This delay would, in any case, involve supplementary expenditure at least to cover the salaries.
   If buildings are retarded too long some large hardware may be delivered before the appropriate buildings for testing and assembling are available. This would result in an embarrassing and costly storage problem, and could invalidate the manufacturer's guarantees.

2. Besides JET the whole fusion programme is strongly affected and hindered by delay in the decision on the JET site. The programme of four of the largest Associations are technically and financially conditioned by this decision. Each of these programmes includes the construction of an intermediate size device whose design is practically complete. TEXTOR would not be built if JET was at Jülich, TORUS 2 would possibly be built at Cadarache instead of Fontenay-aux-Roses if JET was at Cadarache, HBS would not be built if JET was at Garching, and the compatibility of building HBTX 2 if JET were at Culham has not yet been assessed.

3. The success of a new experiment such as JET is largely determined by the enthusiasm of the team which is in charge of it. It is evident that repeated delays are increasingly discouraging for the staff. This makes it difficult to keep the team at its present level, and almost impossible to increase it as required.
   The construction of JET requires also a real cooperative effort from the industries involved. One cannot expect a full commitment to be undertaken as long as the final decision is lacking.
   Within the fusion programme of the Community the cooperative atmosphere is jeopardized by the lack of decision on the JET site. Any initiative is a priori suspected to be motivated by selfish interests more or less directly connected with this problem.
   Outside the Community the credibility of the fusion programme is rapidly decreasing. As was pointed out in the meeting of the Fusion Power Coordinating Committee of the IEA on 6 April 1976, collaborative planning with the Community is hindered by the weakness of our decision-making procedures.

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In fact, it is extremely difficult to understand why a project on which agreement is unanimous is delayed again and again due to the difficulty of choosing the site.

4. The consequences of choosing a site for JET and the weight of interests involved are not so wide and important as to justify long-continued discussions, hesitations and repeated delays. The Commission stresses again that JET is only one of several important steps to be achieved on the way to the fusion reactor.

5. Any decision to carry on the work on the JET project without knowing the site would be not only unrealistic but also dangerous: it could entail technical mistakes and useless supplementary expenditure. It would be difficult, for example, to avoid placing orders for power supply components which might turn out to be unsuitable or even unnecessary for the site finally chosen. One would be brought to produce detailed designs of the buildings in several versions, more or less optimized for different sites. Since only one design would finally be utilized, this work would represent a waste of manpower and money.

6. In conclusion the Commission does not see how one could avoid that the further delay in the final decision implied in any temporary solution will result in similar additional delay in the first operation of the device. On the contrary, any temporary solution would present serious drawbacks. Moreover the Commission does not see any advantage in letting months go by before finding a solution to the site problem. The Commission therefore urges the Council to take a final and complete decision on JET without further delay.

Chapter VI: SUPPLEMENTARY INFORMATION ON THE CHOICE OF THE SITE

No essential new argument has arisen on this matter, nevertheless the information given below might be useful.

1. During the discussions which preceded the Council meeting of 24 February 1976 and in the last few months the Commission has realized that the importance of the criterion of power supplies had been underemphasized in its Communication to the Council on the JET site (Doc. COM(76) 8 final). In fact if the power supplied to JET is directly drawn from the network, this must not only be able to supply a very high power level but also to withstand large frequent and rapid load variations and other abnormal load characteristics required for the regular operation of JET.

   From this point of view Ispra, which is directly supplied by a line connecting a thermal with a hydroelectric power station, is in an exceptionally good position in Europe, and in by far the best position compared with all the other proposed sites.

   It should be recalled here that the only practicable alternative to the direct supply of power from the network is the construction of several expensive motor flywheel generator sets. The increased attention devoted to the problem of auxiliary heating, which will require extra power (see point 7 of chapter I), adds further weight to the power supply arguments.

2. The importance of power supplies is also illustrated by the criteria applied in the search for the site of T-20 (USSR). The first condition is the full-time availability of 2000 MW of electric power; moreover, an adequate cooling water capacity should be available at the site. It is rumoured that T-20 is to be built at CHATURA, about 120 km from Moscow, in a power station, near a focal point of the electric power network. No research centre exists in the vicinity of this site. For the Japanese large tokamak JT-60 the search for a site is being limited within a radius of 30 km from a focal point of the power network.

3. An essential requirement for the Community character of the project is the international composition of the team. Therefore the site must offer all the characteristics and facilities necessary to meet this requirement.

4. Finally the Commission believes that all the statements made in its Communication to the Council on the JET site are still fully valid.

CONCLUSION

As a conclusion of the foregoing discussion of scientific, technical and financial aspects and of the management structure of the project, and taking into account the opinion of the Consultative Committee for Fusion on all these aspects (see ANNEX), the Commission confirms that there is no reason to delay the final decision on the construction of JET. This decision cannot be taken separately from the approval of the choice of the site. Any attempt to justify a further delay cannot be based on objective scientific, technical, financial or management arguments. Any temporary solution would be unrealistic and present serious drawbacks.

In the present situation the lack of decision is jeopardizing not only the project itself and the implementation of the whole fusion programme, but also the credibility of the decision-making capacity of the Community Institutions.

During the Council meetings of 15 December 1975 and 24 February 1976 no convergence has appeared on any alternative solution to the proposal of the Commission. The Commission insists on the objective validity of its proposal, and urges the Council to take a final decision on it.

O P I N I O N

of the Consultative Committee for Fusion

on the JET Project

Having met in Brussels on 5 April and 17 May 1976, the Consultative Committee on Fusion has unanimously adopted the following opinion:

(a) Scientific status

The essential objective of JET is to obtain and study a plasma in conditions and dimensions approaching those needed in a thermonuclear reactor. This objective involves four main areas of work:

(i) the scaling of plasma behaviour as parameters approach the reactor range,

(ii) the plasma-wall interaction in these conditions;

(iii) the study of plasma heating, and

(iv) the study of alpha particle production, confinement and consequent plasma heating.

The CCF underlines that the ultimate goal is to achieve alpha confinement and considers that the physical parameters of the project, at present knowledge, are in accordance with this goal.

(b) Technical status

The CCF commends the Commission and JET project for arranging for the JET design to be examined carefully and independently by a separate assessment team. The C C F notes that the final consultation between the JET team and the Independent Assessment team has produced a satisfactory outcome because the broad design has been verified. This gives confidence that the machine can be built and operated as planned.

The present state of the design allows the project to pass immediately to the construction phase except for consideration of the power supplies and buildings whose design cannot be finalized as long as the site is undecided.

(c) Status of the Cost Estimate

After examination of the present status of the project including the final position of the Independent Assessment team on cost estimates (which proposed an increase of 5 Mua) the CCF accepts the cost estimate for the five year construction phase to be 135 Mua at March 1975 prices.

The preliminary estimate of the CCF is that the costs for a five year exploitation phase will be roughly in the same order of magnitude.

The CCF stresses the necessity to provide for a mechanism which allows the funding of the project to be adapted to the situation of prices and currencies (inflation).

(d) Structure

The CCF considers it essential that the structure of the JET project must be conceived in such a way that it has at its disposal all the managerial functions, flexibility and the decision power necessary to achieve success.

To this end, some delegations considered it suitable to have an independent legal entity for JET while some delegations supported the proposal of the Commission for a JET Association.

In order to speed up the organization of the JET project and the discussion of structural, financial and industrial questions, the CCF:

recommends the Commission to create immediately the JET Council and the JET Management Committee and to ask the Partners to nominate the members, in consultation with the Commission.

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(e) Conclusion

In summing up its conclusions the CCF strongly recommends the realization of the JET project and urges the Council of Ministers to take all necessary decisions as early as possible.