Report of the ITER SWG-P2 to the ITER Council on Joint Implementation of ITER[1]

1. Introduction

(1) The next major step along the path to establishing fusion as an energy source is to construct and operate a fusion device, the overall programmatic objective of which is to demonstrate the scientific and technological feasibility of fusion power for peaceful purposes. Recent work undertaken in the international collaborative frame of the ITER Engineering Design Activities (EDA) Agreement has established the technical basis for taking such a step in a facility that will integrate key scientific and engineering features of fusion energy systems, and the SWG report of 30 January 1999 has reached the conclusion that *"the world program is scientifically and technically ready to take the important ITER step"*.

(2) This present report is intended to serve as a non-binding basis for the start of Explorations.

2. Joint Implementation

(1) The technical challenge of realizing ITER and its estimated cost and duration make ITER one of the most significant single civil R&D projects in the world, and calls for a pooling of technical expertise and sharing of resources world-wide.

(2) Taking into account the genesis of ITER as an initiative at summit level (in 1985 and 1986 and at the Birmingham G8 meeting, May 1998), the international nature of both the energy/environment problem and the fusion research effort so far, and the success of international collaboration on ITER phases of "Conceptual Design Activities" (CDA) and the ongoing EDA, the SWG-P2 recommends and has entirely focused on *joint implementation* of the Construction, Operation, Exploitation and Decommissioning Activities (COEDA) of ITER, which is expected to involve a balance of cost-sharing and status in governance, and a fair return in benefits.

(3) Accordingly, the EDA Parties, namely EU (with Canada as associate), Japan, and Russian Federation (with Kazakhstan as associate), should prepare for the establishment of an ITER collaboration by an international agreement which must meet the challenges of the project and ensure the degree of stability and the distributions of benefits, cost, and governance necessary for a project of this scale.

3. Benefits

(1) The Parties will share scientific and technological benefits from the construction, operation and exploitation of ITER. The scientific output of ITER will be open equally to all Parties and they will jointly develop an understanding of fusion science and technology, including industrial know-how and spin-off in meeting ITER's overall programmatic objective. By participating in a joint implementation of ITER, each Party will make optimum use of past investments in fusion and will incur lower costs relative to those of undertaking ITER in a solely domestic programme.

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[1] The current SWG-P2 Task was defined at the ITER meeting in Cadarache in March 1999 (ROM 99-03-10, 6.3). This report follows on from the SWG-P2 report on its Task # 1, which was approved by ITER Council in July 1996 (IC-10 ROD Attachment 10).

(2) The Host Party obtains the prestige of having been chosen to host an international project of highest quality and visibility. This report does not address the issues of possible general economic benefits from a participation as Host or otherwise in the implementation of ITER.

(3) The terms of the collaboration must ensure that fair returns accrue to the Parties with respect to successful scientific and technical proposals, experimental opportunities, and industrial contracts.

4. Contributions

(1) To maintain the international character of the project and to reflect the common interest and shared responsibility to pursue jointly the programmatic objectives, each Party should make a significant contribution to the total cost of the project needed in construction, operation and decommissioning phases. The common area of construction[2], which is estimated at about three quarters of the total capital cost, should be shared among the Parties in a way which is as balanced as possible.

(2) The Host Party should bear the remainder of the capital cost which includes the construction of buildings and infrastructure, as defined in the approved design, and machine assembly. In addition, site preparations to satisfy the "ITER Site Requirements" will be undertaken, in principle, by the Host at its cost.

(3) The Host Party will also be expected to accept special responsibilities to ensure that the project will come to fruition, including the provision of the necessary legal framework for licensing and management of a due process for decommissioning and preparing an appropriate socio-cultural infrastructure, such as construction and maintenance of facilities for schooling. The non-Host Parties should also provide due contributions such as services for education system based on the Parties' needs.

(4) The annual operation costs (staff, system maintenance and repair, enhancements and electricity etc), assumed as 6-7% of the construction cost, should be shared among the Parties in ways compatible with the sharing of the construction cost.

(5) The sum of the contributions from each Party foreseen at the time of adoption of the international agreement must cover 100% of the estimated total resources needed throughout the project.

(6) The international agreement should define the total amount of the estimated costs for the ITER project expressed in a new unit based on the currency chosen for the F.E. in the agreement, and distribution of contributions among the Parties.

5. Legal Framework

(1) The decision to construct ITER should be taken, together with the setting in motion of joint implementation, by means of an international agreement, signed and ratified, accepted or approved in accordance with the due process of each Party to secure the highest level of political commitment and stability for the implementation of the project.

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[2] defined as items that could be produced in any of the Parties and transported to the site.

(2) The international agreement should provide for the establishment of an ITER legal entity (ILE) to be jointly set up and supported by the Parties, with the responsibility to implement ITER. The ILE must have the charge, the structure, the authority and means to implement the project for the Parties. While the ILE will have to comply with the applicable laws and regulations of the Host, the need for the institutional independence of the ILE from the Host authorities is recognised.

(3) Subsidiary statutes or protocols implementing the ILE should provide the instruments for the normal exercise of management responsibility. They must allow for the flexibility that will be necessary to bring the ITER project to fruition over the several decades of the project. Thus, the distribution of terms and conditions between the international agreement and the statutes/protocols requires careful consideration.

(4) The provision of the site and local technical support by the Host Party should be the subject of a site support arrangement between the ILE and the Host.

(5) Within the legal framework, there should be two organs of project management:
- a Council, composed of Parties' designated representatives which will be responsible for the promotion and overall direction of the project, and will exercise overall supervision of its execution; and
- a Director-General, who will be the chief executive officer and the legal representative of the ILE, and who will be responsible to the Council for the execution of the project.

(6) Members of the Council will also bear the responsibility, in their domestic systems, to promote and protect the interests of the project and to sustain support throughout its entire duration.

(7) The Director-General must be vested with the managerial powers to lead ITER towards success. He will be assisted by an ILE staff over whom he should have sole managerial authority. He should be responsible for all the technical aspects of the project's execution, for compliance with the Host's regulatory requirements for worker and public safety, and for the protection of the environment.

(8) The balance of the Parties' status in the governance of the Project will be set primarily by the allocation of voting weights in the Council's decision-making process which should take into account the following:

1. decisions requiring consensus;

2. decisions requiring Host Party concurrence; and

3. decisions reached by voting, where the Parties' votes are weighted in relation to their contributions, while no issues may be decided solely by a single Party.

(9) The decision-making process for the scientific programme, which will be based primarily on scientific arguments, should also contain an element to reflect the contributions of each Party.

(10) The international agreement may lead to the ILE being established either under international law or under the domestic (civil or public) law of the Host.

(11) The issues of privileges and immunities and other facilitations to be accorded by the Parties are to be discussed in the Explorations/Negotiations, the results of which will be reflected in the international agreement or subsidiary instruments.

6 Siting, Licencing and Decommissioning

6.1 Siting

(1) The Parties wishing to host the ITER facility should make a formal single specific site offer before or at a sufficiently early stage of Negotiations which should confirm the readiness to satisfy the ITER Site Requirements and the extent to which the Site Design Assumptions are met, based on the document approved by the ITER Council.

(2) By this time each such Party should have in place the procedures to follow in order to licence construction and operation of the facility and should produce a statement through the appropriate regulatory authority that indicates that no major impediments to licencing ITER are foreseen.

6.2 Licensing

(1) An early, informal dialogue with regulatory authorities should be established with the aim of developing common views among the Parties on the principles and criteria for ITER safety, also because of its possible impact on licensing of future fusion energy facilities.

(2) This dialogue should orient efficiently the technical preparations for license applications with a view to solving the major technical issues before adoption of the international agreement.

(3) Therefore, at that time, the Parties should have confirmation that ITER can be licenced in the Host country (and that the licencing process would not be unduly vulnerable to challenge). The international agreement should make special provisions to deal with possible consequences of the licencing process.

6.3 Decommissioning

(1) With respect to decommissioning, only de-activation[3] should be within the responsibility of the ILE. Responsibility for carrying out the remaining decommissioning steps should rest with the Host Party.

(2) In accordance with normal practice, financial provisions for decommissioning and long term storage and disposal of activated materials which belong to the ILE should be made jointly by the Parties through a fund to be established under the international agreement and built up during operations and safeguarded for this purpose. Any guarantees demanded as part of the licensing process should be the responsibility of the Host Party.

(3) The SWG-P2 points out that components introduced into the ITER facility by a Party and still under the ownership of that Party at the time of decommissioning shall, in principle, be brought back by the concerned Party at its own cost to its home territory. However, at that time, each Party may choose to give up and transfer the ownership over the introduced components to the ILE by agreement. The terms and conditions under which the ILE accepts

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[3] "De-activation" covers actions to put the plant into a safe, stable condition while it awaits dismantling, and includes removal/stabilisation of tritium and residual mobile activation products, removal and packaging of in-vessel components, rendering of all liquid to safe, stable form and protection for components vulnerable to corrosion during the storage/dismantling process.

such components should be defined during the Explorations/Negotiations leading to the international agreement.

7. Procurement

(1) From the perspective of successful project management, the procurement process should primarily focus on technical performance, quality, schedule and cost, and should provide the opportunity for the ILE to directly exercise technical oversight of the procurement process and performance of engineering and manufacture.

(2) Within the above provision, components/systems and services for ITER could be procured in one of two ways according to each Party's preference, either as contributions in kind procured and supplied by specified Parties for a pre-determined credit value or procured directly by the ILE using funds contributed by the Parties to its budget ("funded"). A Party providing an in kind contribution bears the risk of having to provide additional resources because of unforeseen conditions encountered by that Party. The need for any additional resources arising from new requirements from the ILE should however be considered as change requiring reassessment of the credit value and other factors. With funded activities, such risks should lie with the ILE but this risk should be shared with the interested Party(ies) according to any conditions attached to the funding.

(3) On the basis of data from the EDA, all Parties should, as soon as possible, be addressing jointly the issues of the overall percentage shares of contributions and of an initial allocation to each Party of procurements. These shares of contributions should be set out in writing at the time of the adoption of the text of the international agreement.

(4) At least some part of each Party's contributions should be provided in funds in order to ensure efficient work in systems integration.

(5) Whatever the mode of procurement, the Director-General, assisted by the project team should be centrally involved in all technical aspects of the process. For example, the project team could be composed of a central team based at the ITER Site and centers, in each of the Parties who, would directly exercise technical oversight of the procurement of items from within each Party. In turn the Parties should designate domestic agencies who would be responsible for the supply of contributions-in-kind and could support administrative aspects of the funded procurements.

8. Staffing

(1) Staffing arrangements should reflect the need to encourage mobility between the project and the rest of the Parties' programmes.

(2) The ITER staff should consist of ILE employees (if so decided), staff seconded from the Parties and contract personnel, all of whom shall report to the Director-General.

(3) The ITER staff complement should be kept to a minimum necessitated by the project implementation and appointed for limited durations. Rules for appointment, term of service etc. shall be set by the Council.

(4) For the purpose of ensuring wide scientific participation in the Project and of training future generations of fusion researchers, participation of other qualified personnel such as

from universities and other institutions will be encouraged under rules to be established by the Council.

9. Finance and Accounting

(1) Financial regulations and implementing measures governing the contribution, use and accounting of ILE funds and procurements in kind should be adopted at the outset of the Project. The financial regulations should include provisions for audit consistent with each Party's fiduciary requirements.

(2) Contributions in kind will be supplied under the normal budgetary and financial rules of the contributing Party subject to any special conditions arising from the international agreement or ILE Statutes/Protocols. The audit requirements in this case will be those normally applied in the Party concerned.

10. Intellectual Property Rights

(1) Intellectual Property Rights (IPR) are part of the benefits. The Parties should designate IPR specialists to jointly develop acceptable IPR provisions for ITER referring to the general principles established for the ITER EDA.

(2) Possible guidelines for consideration/development by the IPR specialists could be as follows:

- As a legal entity the ILE should have the capacity to own intellectual property and should do so under the terms to be established in an IPR annex to the Statutes.

- In accordance with ITER's programmatic objectives, the intellectual property (IP) regime should favour a liberal dissemination of information consistent with the ITER IP terms and conditions. Subject to the other ITER IP provisions already agreed, the scientific results derived from ITER operations should be widely and freely accessible among the Parties for the purposes of fusion R&D for peaceful uses.

- The technology know-how derived from the construction, operation and decommissioning of ITER should also be shared among the Parties for the purposes of fusion R&D for peaceful uses. But there will be safeguards to protect pre-existing business confidential information and to protect the rights of Parties making contributions-in-kind for the commercial exploitation outside the domain of fusion R&D of intellectual property generated in producing the contribution.

11. Participation and Accession[4]

(1) The Parties to the international agreement should be the present EDA participants.

(2) Expressions of interest during the Explorations/Negotiations phase from other possible participants in joining from the start of the agreement should be treated on a case-by-case basis, taking account, inter alia, of the progress towards convergence achieved among the current participants.

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[4] Terms for possible withdrawal from the participation should be set so as to protect the mutual interests of the project and the remaining Parties, especially during the construction phase.

(3) The international agreement should allow for possible third parties to join the Project after adoption of the agreement. Any such requests should be decided by unanimity among the Parties. The international agreement should provide both for full accession of new Parties, under terms such as a significant contribution and commitments, and for other forms of participation such as possible "associate" membership for which lesser conditions of participation and status in the collaboration should be agreed.

12 Conclusion

In the process and at the conclusion of its discussions, all delegations of the SWG-P2 have agreed that they:

- share a single vision of the ITER goal and of the means to realize it;
- recognize the technical and social import of ITER for the realization of fusion energy;
- reconfirm the common desire to promote construction of ITER through international co-operation; and
- recognize that the time is now ripe for initiating international efforts with governmental involvement with the aim to establish a firm international legal framework for joint implementation of the ITER project.

The SWG therefore proposes to the ITER Council, according to the terms of the present report, to recommend to the Parties to start Explorations[5] in early 2000 among the interested parties with the view to reaching, at the time of the Joint Assessment foreseen for summer 2000, a common understanding on the necessary steps for a future decision on the Construction, Operation, Exploitation and Decommissioning of ITER.

[5] Suggested Milestones are:

Start of Explorations	early 2000
Interim position	at the time of the Joint Assessment
End of Explorations	by end of 2000
Start of Negotiations	by July 2001

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