

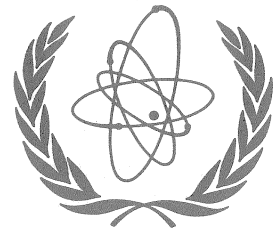
INTERNATIONAL THERMONUCLEAR EXPERIMENTAL REACTOR



ITER EDA NEWSLETTER

VOL.2, NO. 10

OCTOBER 1993

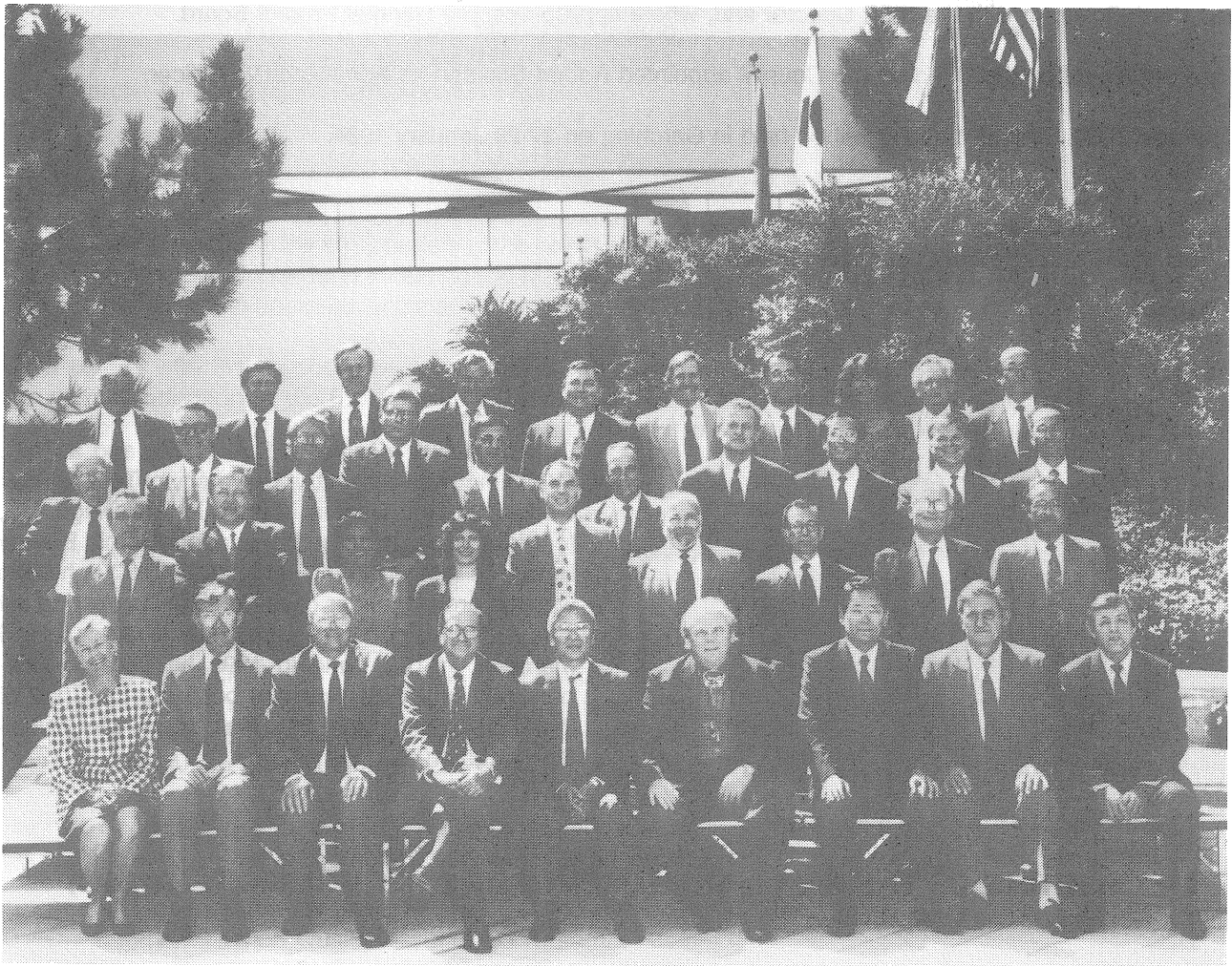


INTERNATIONAL ATOMIC ENERGY AGENCY, VIENNA, AUSTRIA

FOURTH ITER COUNCIL MEETING

by Dr. V. Vlasenkov, ITER Council Secretary

The fourth meeting of the ITER Council was held in San Diego 29 September - 1 October 1993. It was attended by all members of the Council; the total number of participants was 41.



Participants of the Council Meeting

The Council took note of the TAC Report concerning the technical review of the ITER design option developments presented by the Joint Central Team. The Council endorsed the recommendations made by TAC underlining that the design should be conceived in such a way as to allow a high probability of starting ITER construction in 1998.

With satisfaction the Council noted the statements made by the Director concerning:

- The limits for the construction cost associated with the forthcoming outline design, in which he believes on the basis of recent work in the JCT;
- The fact that the design will be based on a water-cooled shield, primarily of stainless steel, but a conceptual design of an advanced blanket should be pursued at low level (1 CAD designer per year) in order to guide the R&D in this important field. An evaluation of the work on the advanced blanket would be undertaken after 2-3 years;
- The fact that a self-consistent outline along these lines will be issued before the last week of December for review by TAC on January 10-12. The design will be accompanied by a preliminary Work Program including a management plan based on this design.

The Council charged SWG-2 to clarify and work out, in close co-ordination with the Director, the priorities within the Joint Fund for adoption by IC-5.

The Council, having heard the statement of the Director concerning the outline design development and the foreseen time table to produce it, asked the four Council members at Program Director level to meet on behalf of the Council (between Council meetings) as appropriate to monitor the progress on the outline design and the Work Program with the ITER Director and, where appropriate, the General Project Board.

Upon proposal by the Director, the Council appointed Robert Sheldon as Administrative Officer.

The next ITER Council meeting will be held in Garching on 27-28 January 1994.

**Dr. Masaji Yoshikawa, ITER Council Co-Chair,
Chair, ITER Management Advisory Committee (MAC)**



Dr. Yoshikawa received a B.A. (1956) and a Ph.D. (1961) in Physics from the University of Tokyo. After working at Gulf General Atomic in San Diego, US, for eight years, he joined the Japan Atomic Energy Research Institute (JAERI) in 1971. Dr. Yoshikawa was the project leader of JT-60 since its conceptual study. He was nominated Executive Director (board member) in 1989, and in 1993 he became vice-president of JAERI. He has been the Co-Chair of the ITER Council and the Chair of the MAC since September 1992.

THIRD MEETING OF THE ITER MANAGEMENT ADVISORY COMMITTEE (MAC) by Dr. M. Yoshikawa, MAC Chair

The third meeting of the ITER Management Advisory Committee (MAC) was held at the ITER Co-Center, Naka Fusion Research Establishment, Japan, on 16-17 September 1993. All MAC members attended the meeting. MAC invited Dr. M. Huguet, Head of the ITER Naka Co-Center, as an expert for MAC as a whole, Mr. T. Ide as an expert for the Japan delegation and Mr. Y. Tajima and Mr. F. Kahle as experts for the JCT.

MAC reviewed the proposed schedule of the ITER meetings, the ITER Joint Fund framework for implementation and provisional budget for 1994, proposals for task agreements, and guidelines for ITER EDA technical publications.

Proposed Schedule of ITER Meetings

At the IC-3 meeting, held 21-22 April 1993 in Tokyo, the Council agreed that MAC's review of the meeting schedule constitute the Council's endorsement. As requested by the ITER Council, the Director provided to MAC the schedule of the proposed Technical Meetings involving JCT and Home Team members as shown in the table below. MAC reviewed the schedule and recommended to the ITER Council to endorse the schedule of Technical Meetings with some request for additional meetings and the need for clarification of the meeting objectives and the documentation of its results.

Date	Meeting	Location
28 Sept. - 4 Oct.	Structural Analysis Technical Meeting	MIT
5 - 8 Oct.	Magnet Technical Meeting	MIT
21 - 26 Oct., (excl. 24 - 25 Oct.)	RF & Current Drive Technical Meeting	Garching
3 - 12 Nov.	Safety & Environment Technical Meeting	San Diego
9 - 12 Nov.	Plasma Equilibrium Technical Meeting	Naka
15 - 19 Nov.	Technical Meeting on Radiation Effects in Vessel Components	Garching
19 - 26 Jan.	Assembly & Maintenance Technical Meeting	Garching
19 - 26 Jan.	Fueling & Pumping Technical Meeting	Garching
22 - 25 Feb.	Magnets & Magnet Safety Technical Meetings	Naka
Feb./March	Tritium Plant Technical Meeting	Naka

The ITER Joint Fund Framework for Implementation and Provisional Budget for 1994

The Director provided to the MAC papers of the Joint Fund framework which set out (1) a proposed mechanism for implementing the Joint fund including the identification of appropriate legal entities, (2) a proposed set of Financial Rules for the operation of the Joint Fund, and (3) Provisional Budget proposals for calendar year 1994.

MAC agreed with the proposed overall framework of the ITER Joint Fund. MAC recommended to the ITER Council the adoption of the Provisional Financial Rules with some modifications and the acceptance of the proposed Provisional Budget Ceiling for 1994 as a basis start implementing the Joint Fund as early as possible.

Proposals for Task Agreements

The Director provided ten proposals involving sixteen Task Agreements more than 300 IUA to MAC for review. The total budgeted credits and total design efforts for these tasks are 9,925 IUA and 20.0 PMY.

- Stability, ramp rate and AC loss experiments and development of layer-layer joints with the four Parties.
- Cabling and jacketing of ITER model coil conductors with the four Parties.
- Design task for magnet design and analysis data with the four Parties.
- Design task for a fabrication handbook for the use of 316LN stainless steel, an assessment of the possible use of Nb₃Al, an assessment of NbTi, and a manufacturing feasibility study with the four Parties.

Reports by the Director on the Task Agreements valued at no more than 300 IUA equivalent are presented in the table below. All are design tasks with a total effort of 5.5 PMY.

- Study of Primary Pumping Systems for Use Inside the ITER Cryostat.
- Development of ITER Quality Assurance Program.
- Plasma Vertical Position Control.
- Spatial Distribution of Heat Load Due to Alpha Ripple Loss with Up/Down Assymmetric Configuration.
- The Design Study of Tokamak Assembly and Tooling.
- Assistance on Waste Management and Dose Calculations.
- Initial Thermal-Hydraulic and Disruption Safety Design Guidelines.

The MAC recommended to the Council general approval of the proposals for the Task Agreements more than 300 IUA and took note of the proposals for the Task Agreement for design tasks costing no more than 300 IUA.

Guidelines for ITER EDA Technical Publications

In conformity with the ITER Council request, the Director provided a proposal for Guidelines for technical publications to MAC for its review. The proposed categories of ITER EDA technical publications are (1) IAEA publications, (2) publication through the ITER JCT, and (3) publications by Home Teams.

MAC endorsed the proposal by the Director and summarized its understandings as follows:

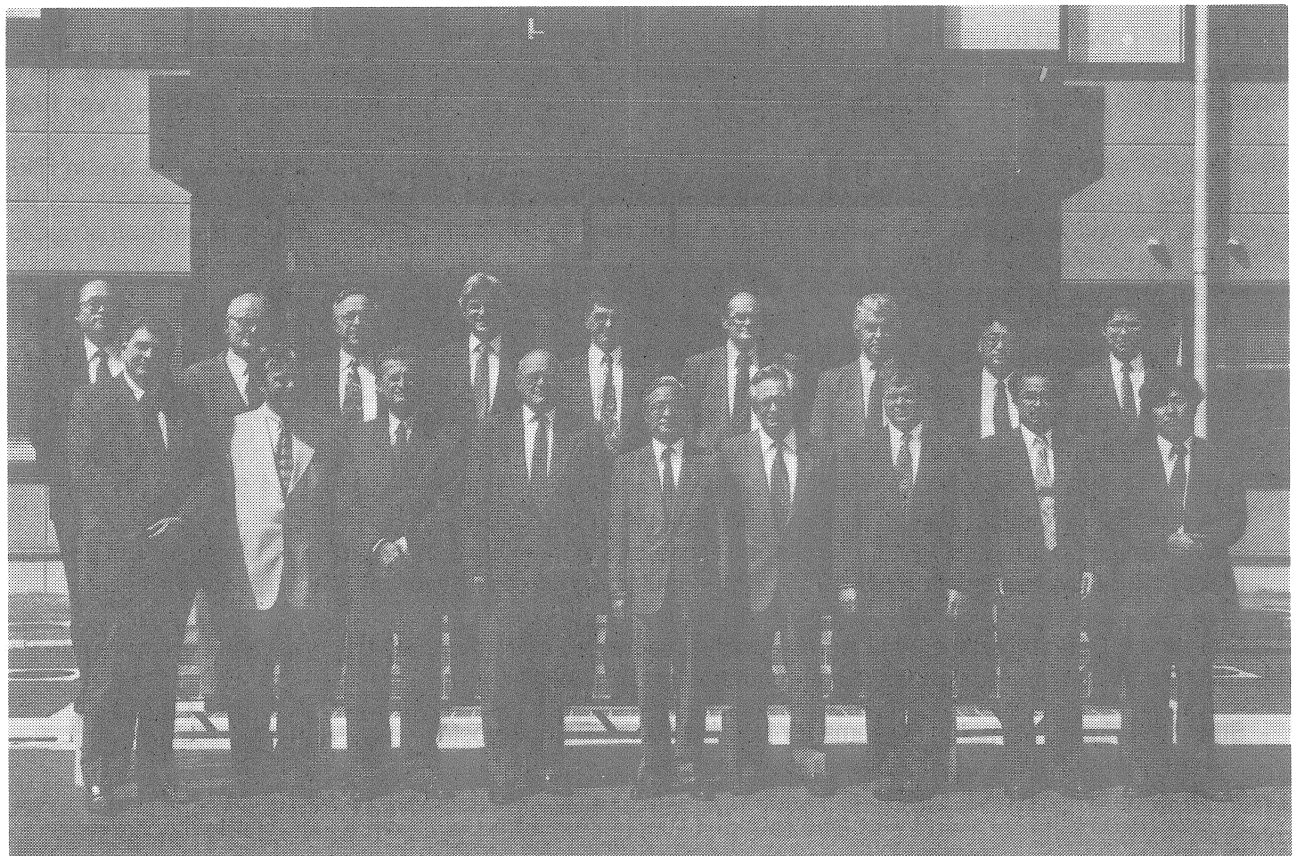
- Publication by JCT members. Follow the JCT internal procedure of approval. Use ITER logo.
- Publication by Home Team members covered by the ITER EDA Agreement. Two options:
 - (a) The HT seek the comments of the JCT Publication Officer. Use ITER logo.
 - (b) The HT do not seek the comments of JCT. A disclaimer by JCT Director is included. Use ITER logo.

Other Business

MAC drew the general attention to the preparation of the Work Program and also recommended to the Council guidelines for the implementation of Task Assignments and the role of industry in ITER design:

- MAC recommends that the Director meet regularly with Home Team Leaders on matters of common concern and, specifically, on the preparation of the Work Program.
- MAC recommends that the Director and Home Team Leaders implement a streamlined procedure for Task Assignments.
- MAC recommends that the Council consider adopting an industrial participation policy and ask the Director to draft such a proposed policy.

It was agreed that the next meeting (MAC-4) will be on 13-14 January 1994, at the ITER Co-Center in San Diego.

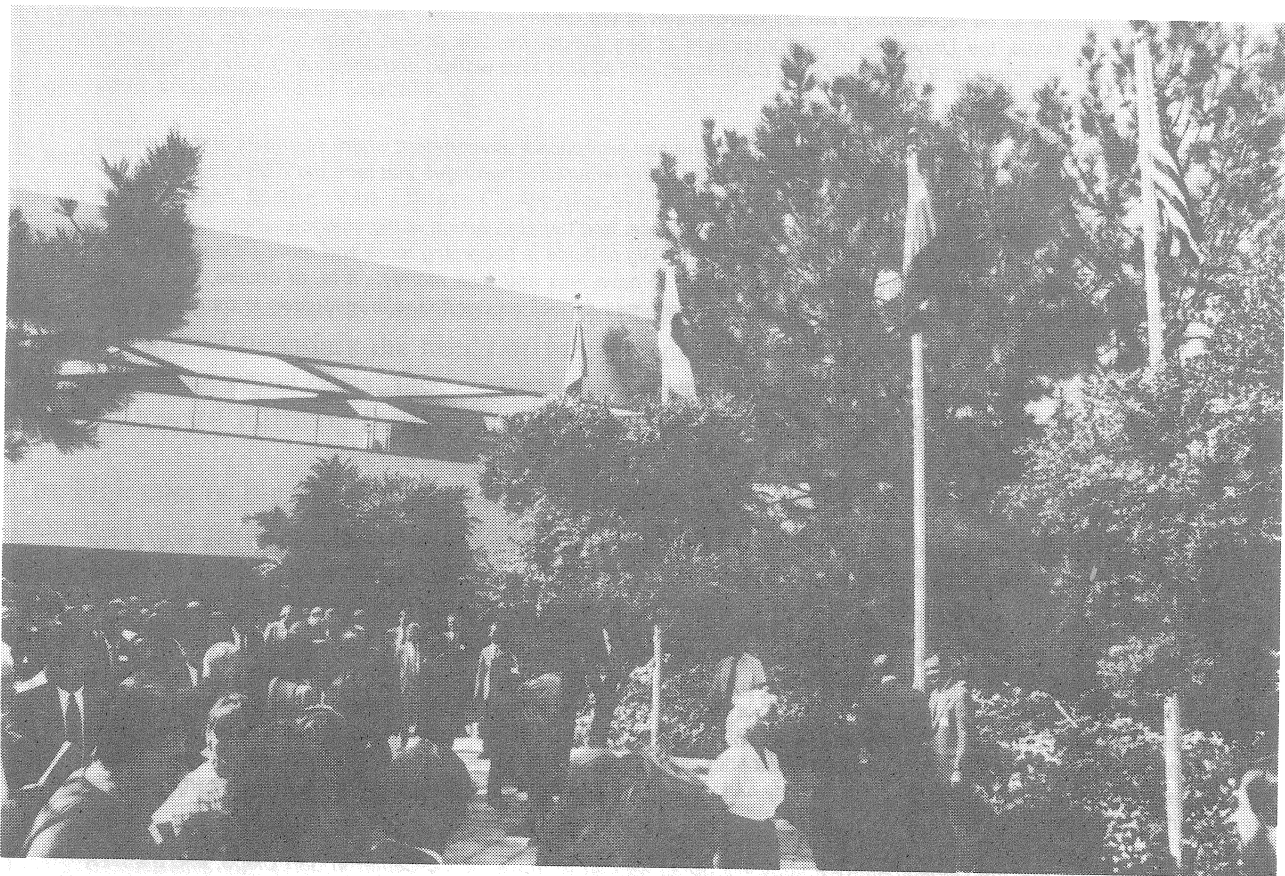


Participants of the MAC Meeting

FLAG RAISING CEREMONY DEDICATES U.S. HOSTED JOINT WORK SITE IN SAN DIEGO, CALIFORNIA

by Dr. M. Roberts, US Contact Person

On October 1, an international flag raising ceremony was held at the ITER Joint Work Site in San Diego. This Joint Work Site is hosted by the U.S. acting through the Department of Energy (DOE). The photograph shows the four flags after the raising. For each flag, the persons performing the ceremony were a member of the Joint Central Team from that Party and the Contact Person for that Party. The flags of the IAEA, under whose auspices the ITER EDA is conducted, and of the State of California, which contributes to the support of the Joint Work Site, are displayed inside the Joint Work Site.



Flag Raising Ceremony

The flag raising ceremony, held in front of the ITER building on a beautiful San Diego fall morning, came after a meeting of the ITER Council held during the preceding days. The actual flag raising followed brief remarks by the senior Council members from each Party. Their statements are contained in the box accompanying this article.

In giving the US Party's remarks, Dr. James F. Decker presented congratulatory letters from US Presidential Science Advisor John H. Gibbons and US Secretary of Energy Hazel R. O'Leary (see next pages). Dr. Gibbons stressed the importance of internationalizing big science projects and Secretary O'Leary focused on the benefits of the EDA to fusion and to the groundwork for construction of ITER. ITER Council Chair Evgenii P. Velikhov spoke on behalf of the RF Party. Professor Paolo Fasella and Mr. Toshi Okazaki spoke on behalf of the EC and JA Parties, respectively. Following the four Party statements, a message from the Governor of the State of California, Pete Wilson was read, and a resolution of the State Assembly was presented by Assemblywoman Dierdre Alpert. Following recognition of the IAEA representative, there was a presentation of a commemorative plaque to the Director and Council Chair. Letters, resolution and plaque are all available for viewing at the Joint Work Site.

Richard C. Atkinson, Chancellor of the University of California, San Diego (UCSD), officiated at the ceremony. UCSD is the Host Organization for the San Diego Joint Work Site.

In addition to the ITER Council delegations, the ceremony was attended by representatives from the state and local governments and from the San Diego business community as well as the Director, Deputy Directors and members of the Joint Central Team, participants and support personnel.

Statement by Dr. J.F. Decker

Chancellor Atkinson, Council Members, Distinguished Guests

It is my pleasure to be representing the US Government at the ceremony today. But first I would like to thank the State of California, the University of California here at San Diego, the City of San Diego, Science Applications International Corporation, a number of local businesses and all who have worked and continue to work, to make this Co-Center a success.

These entities have co-operated to make this Co-Center an exceptional environment where scientists and engineers from the four ITER Parties can work to overcome the many technical challenges that face the ITER project.

We are, I think, entering a new era in regard to big science, and certainly fusion is big science, where co-operation internationally is becoming more and more important. Big science is becoming more and more expensive right at the time when governments around the world seem to have less and less money. It is, of course, also a very sensible thing for all of us to pool our intellectual resources as well as our financial resources to carry out these endeavours.

Fusion provides an excellent opportunity for international collaboration:

- it is a promising energy source; all countries need energy*
- it is technically challenging*
- it is expensive R&D*
- commercialization is not immediately upon us*

There is a long history of very successful international co-operation in fusion. ITER takes us to a new level of co-operation, one that is very challenging.

I would like to read to you this morning a letter from Dr. John Gibbons, Assistant to the President for Science and Technology, and share with you some of his views on this subject. (Please see letter on page 7).

ITER is often referred to as a "key element" in the US fusion program. I think "key element" is really not a strong enough description. It has really become a very central theme of the US fusion program. In fact, I would like to quote from a document that was put out by President Clinton early in his Administration. The President stated, "fusion energy research is an important part of my national energy strategy and the central piece of the research effort in magnetic fusion energy is ITER."

I assure you that the Department of Energy will do all we can to make the Co-Center in San Diego, and the ITER project as a whole, a success. In that regard, I would like to read one final letter from Hazel O'Leary, Secretary of Energy. (Please see letter on page 8).

Again, I like to express my thanks to all of you who have worked so hard to make this Co-Center a reality.

THE WHITE HOUSE
WASHINGTON

September 30, 1993

Dear Members of the International Thermonuclear Experimental Reactor Council
and Distinguished Guests:


I welcome this opportunity to extend best wishes on the occasion of the raising of the flags of all ITER Parties at the San Diego Co-center of the ITER Engineering Design Activities. I regret that scheduling difficulties prevent me from being there.

Fusion has the potential to become a significant addition to the mix of energy sources that will be required to satisfy the needs of future generations throughout the world. By bringing together, on an equal basis, the resources and creative talent of the ITER Parties, you are working toward fulfilling fusion's potential in a most appropriate way.

The high cost of big science projects along with budget constraints underscores the need for increased internationalization of these projects. The United States places great emphasis on such collaborations. The experience gained in establishing and implementing the ITER Engineering Design Activities constitutes an important, unique mechanism for international collaboration in large science projects. In addition, ITER has also brought to our attention certain administrative impedimenta, such as visas, taxes and joint funding, that must be streamlined in order to facilitate future large science international collaborations. Therefore, your challenge is twofold: the technical design and development of ITER, and the equally important development of successful mechanisms for large scale international collaboration.

Congratulations on your progress to date and may you have continued success in meeting these important challenges.

Sincerely,


John H. Gibbons
Assistant to the President
for
Science and Technology



The Secretary of Energy
Washington, DC 20585

October 1, 1993

Dear Council Members and Distinguished Guests:

The United States Department of Energy welcomes you to the flag raising at the San Diego International Thermonuclear Experimental Reactor Co-Center.

The scientists and engineers of our nations not only are entering an important stage of fusion development but also are developing a new approach to international collaboration for major science projects, founded on the principle of equal sharing of benefits as well as costs.

The Department of Energy does not underestimate the challenges facing you in this endeavor. Creativity, innovation, and teamwork will be necessary to resolve the technical and managerial issues that inevitably will arise in such an arrangement. However, through cooperation, technical excellence, and continued commitment, you will succeed. The benefits of successfully completing the engineering design activities will be significant, not only in the development of fusion reactor design and technology, but also in laying the groundwork for the construction of the International Thermonuclear Experimental Reactor.

Successful engineering design activities with the International Thermonuclear Experimental Reactor will be essential to the development of fusion energy as a viable commercial energy source. The Department of Energy is proud to be a member of the team and is committed to its success.

Sincerely,

A handwritten signature in cursive script that reads "Hazel R. O'Leary".

Hazel R. O'Leary

Statement by Prof. P. Fasella

Chancellor, Chairman, Members of the Council, Distinguished Guests, Colleagues

Journalist Berkeley Morgan wrote of La Jolla "The place where California character meets Mediterranean style". This "fusion" of cultures does make of La Jolla "the jewel" which the Spanish origin of its name implies. This is an inspiration for us: constructive collaboration among cultures, for a common purpose, through mutual understanding is at the core of the Joint Venture ITER. Scientists and technologies have always collaborated across national borders, but the amount of goodwill and mutual understanding required by megaprojects is well beyond what has been experienced up to now.

ITER, as the Latin meaning of its acronym implies, should represent the "way", which world science will have to go in order to obtain the means required by its ambitions.

Close collaboration across the borders is not only a necessity for big science, it is an asset. This is the experience we have had in half a century of large-scale operation in western Europe, be it at CERN, JET, ESO or ARIANNE.

In the case of the EC Fusion Programme, something new has been created by the interaction of "l'Esprit Français", "Deutsche Gründlichkeit", "British Pragmatism" and, this may perhaps surprise you, "Italian Wisdom". The latter is a reference to Donato Palumbo, the now retired architect of the European Fusion Programme.

ITER is an experiment not only in science and technology but also in science management.

In "physical fusion", the enormous amounts of energy we want to use are not released unless the reacting nuclei are brought to "fuse", overcoming repulsive forces by initial supply of energy and confinement.

In ITER the expected advantages of the project will not be attained unless energy (in terms of human and financial resources) and confinement in terms of wise administration and leadership are all provided.

The ITER project in its various components: the Director and his Deputies, the Central and Home Teams, the ITER Council, the TAC and the MAC, their Presidents and Members are working towards the common goal, overcoming the many, inevitable, administrative and cultural problems.

Good work has been performed under Academician Velikhov in the first meeting of the ITER Council held in California.

It is therefore with vigilant confidence that we participate in the raising of the flags. After the opening meeting in Moscow last year and the flag raising in Naka, we are glad to be here and to have the opportunity to thank the US, Californian and local authorities, the University and industrial companies for their generous and efficient support of ITER in the past, present and future. It is also an occasion to invite you also on behalf of Professor Pinkau to the opening ceremony in Garching next January.

Statement by Acad. E.P. Velikhov

As the Chair of ITER Council, it is a great privilege for me to inaugurate the opening of this Co-Center at La Jolla, California. It is a result of long development, forty years of development of Tokamaks. Tokamaks started their life in secret in the obscure laboratory which was the Kurchatov Institute forty years ago, under the influence of reports from two famous scientists, Tamm and Sakharov, and based on the theory developed at Kurchatov by Shafranov and at Princeton by Kruskal, the theory of stability. Afterwards, there was a long, embryonic development which was pushed by our famous scientist Artsimovich before he asked the scientists from Culham Laboratory to verify the results. After they had evaluated the experimental results and confirmed their correctness, Tokamaks diffused like a flu around the globe. Today we are witness to the very important development in the largest Tokamaks, the Joint European Torus, the American TFTR, and the Japanese JT60.

The development of physics of Tokamaks and the results of experiments assure us that we are very close to scientific breakeven where the input energy to the Tokamak plasma is equal to the fusion energy output. It is optimistic to say "very close", but I am sure we are indeed very close. On the basis of these results, we have started the development of the International Thermonuclear Experimental Reactor (ITER). This development was started at the East Coast at MIT, by the pioneer in fusion reactor research, David Rose, who proposed in the mid-seventies to start an international co-operation in building an international fusion reactor.

It was a long, bumpy road because it was not only a scientific and engineering, but also a political enterprise. The political relations have improved. By today, I think, we have finished the Cold War but it should be remembered that the effort was started during the Cold War.

We are witness to a real first great example of international scientific and engineering endeavour.

I wish great success to this Co-Center and our Director, Paul-Henri Rebut, who is one of the most experienced scientists and a successful engineer and has real management experience in international projects to fulfil this extremely important and difficult task to design and then to build a fusion experimental reactor as our input to the next century's solution to the energy problem.

As the representative from the Russian Federation, I am very happy to see here the Russian flag and Russian scientists and Russian people after their absence of nearly a century. More than one hundred years ago, Russian people were very successful in California: Russian-American trade companies settled down on the Russian Hills in San Francisco. And, finally, I am very grateful for the great support which the Californian people, the people of San Diego and La Jolla, UCSD and SAIC, give to this enterprise at La Jolla, which is, I think, one of the most beautiful places on our planet.



Assemblywoman Dierdre Alpert presenting a resolution of the State Assembly

Statement by Mr. T. Okazaki

Ladies and Gentlemen,

On behalf of the Japanese delegation, I would like to make a few short remarks to express our heartiest congratulations to ITER on the occasion of today's Flag Raising Ceremony.

First of all, I thank the people concerned for inviting us.

ITER is an unprecedented international collaboration in both its spirit and framework.

In the field of mega science, there has never been before such a unique collaboration as ITER. The four Parties have reaffirmed the principle of equality regarding their status, their contributions and their benefits from the co-operation. Specifically, the four Parties have organized a "tetrahedron", which scientists worldwide consider to be a most stable and effective framework.

Among the three Co-Centers, San Diego is of particular importance, in the sense that here the Director and his staff members will integrate the designs in close co-operation with the other Co-Centers and Home Teams.

Finally, but by no means less importantly, I would like to mention the speedy arrangement of host support. We sincerely appreciate the efforts made by SAIC, UCSD, the State of California and the US DOE. I would like to congratulate all of you again. Thank you very much.



Presentation of Commemorative Plaque at Flag Raising Ceremony on 1 October 1993 at the ITER San Diego Joint Work Site. From Left to Right: Dr. Decker, Acad. Velikhov, Dr. Rebut and Chancellor Atkinson

Items to be considered for inclusion in the ITER Newsletter should be submitted to B. Kouychinnikov, ITER Office, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria, or Facsimile: 43 1 237762 (phone 23606392).

Printed by the IAEA in Austria
December 1993