



EFDA-JET Bulletin

Special Issue

20th May 2004

25th Anniversary of Laying the JET Foundation Stone and 20th Anniversary of the JET Official Opening

After a three year wait for the decision on where JET would be sited, JET was founded on the 1st of June 1978 by a decision of the European Council of Ministers.

The laying of the first stone was performed on the 18th of May 1979 by Dr G. Brunner, commissioner of the European communities, received by A.M. Allen, Chairman of UKAEA, J. Teillac Chairman of the JET Council, in the company of D. Palumbo, H.O. Wüster and R.S. Pease.

The ceremony was the symbol of the start of JET construction and it was also the symbol of the three main JET partners : the JET Council, the European Commission and the Authority.

It was the first stone for the office buildings. The ceremony took place just outside the construction site which was not accessible and muddy. The first stone was incorporated later into the construction.

You will still see this stone when you move from the entrance hall to the control room.

This was the first celebration on the JET site.

Dr. Paul-Henri Rebut,
JET Design Team Leader, former JET Director.



18th May 1979 : The JET foundation stone was laid by Commissioner Dr Guido Brunner



9th April 1984 : JET was officially opened by Her Majesty Queen Elizabeth II, M. François Mitterrand (President of the French Republic) and M. Gaston Thorn (President of the Commission).

The official opening of JET with the participation of persons at the highest national and European level was a success in many respects.

It was indeed a success for Euratom in assembling the financial support and in establishing JET as a Joint Undertaking within the appropriate legal framework.

But above all for having supported the establishment of a truly European community of scientists.

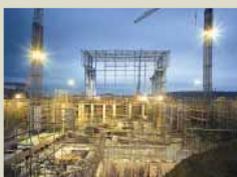
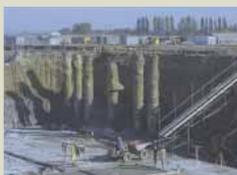
This community unanimously recognized the need for a machine significantly larger than those already operating in the associated laboratories. This made possible a selection of excellent staff and leaders on a short timescale.

An essential ingredient of the success was the level of responsibility and freedom of action given to the Project Leader. An example of efficacy is represented by the Design Team work which, under Rebut's supervision, produced in a very short time the detailed design of the project.

I hope that these examples will serve as a guide for larger scale research on fusion in the future.

Prof. Donato Palumbo,
Former Director of the Research in EURATOM.

JET History



"In this business, you publish in steel and concrete."

Hans-Otto Wüster, the first JET director, in New Scientist, 20th May 1982 (Right)

"Since assembly of the torus began in January this year it has progressed at an astonishing pace"

Financial Times, 24th November 1982



JET history in dates

- 1971 Council of the European Community decided in favour of a robust fusion programme and provided the necessary legal framework
- 1973 JET design work began
- 1977 (25th October) JET sited in Culham
- 1978 (1st June) JET Joint Undertaking entered into force
- 1979 (18th May) JET foundation stone laid in Culham, UK
- 1983 JET construction completed on time and on budget
(25th June) First JET plasma (19 kA)
World first 1 MA plasma current, 3 MA by year end
- 1984 (9th April) JET Official Opening by Her Majesty Queen Elizabeth II
First Vertical Displacement Event (disruption)
- 1985 Technical objectives met: plasma current (4.8 MA), toroidal field (3.4 T)
3 MA X-point operation demonstrated
- 1986 8 MW of ICRH coupled to plasma – electron temperature 10 keV
10 MW of NBI injected into plasma – ion temperature 12 keV
X-point operation gives H-mode confinement
Single pellet injection – peak density $2.5 \times 10^{20} \text{ m}^{-3}$
- 1987 Plasma current reaches 7 MA
- 1988 NBI power increased to 21 MW – ion temperature 20 keV
Total heating power increased to 35 MW
World first production of Internal Transport Barrier (ITB) with Pellet Enhanced Performance (PEP)
- 1989 Beryllium components and evaporation used in JET
- 1990 ICRH coupled power increased to 22 MW
Prototype LH launcher – current drive up to 1 MA
- 1991 (9th November) World first controlled release of D-T fusion power
1.7 MW peak fusion power, 2 MJ fusion energy
- 1992 Rebuilding of the machine with Mark I pumped divertor
7 MW LHCD system introduced

JET History

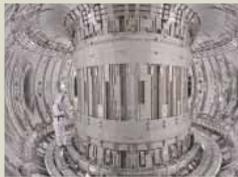
- 1994 Plasma detachment in divertor
Steady state ELMy H-modes
- 1995 Installation of Mark II divertor
"Wind tunnel" energy confinement experiments
- 1996 Optimised shear plasmas with Internal Transport Barriers produce record
D-D fusion power
Ion temperature exceeds 30 keV
- 1997 World record Deuterium – Tritium campaign (DTE1)
16.1 MW fusion power, 22 MJ energy release
First clear evidence of alpha-particle heating
Steady fusion power of 4 MW maintained for 4 seconds
Ion temperature 40 keV
- 1998 First fully remote exchange of divertors – gas-box divertor installed
- 1999 Toroidal field increased to 4.0 T
Confinement increases with triangularity
MSE measurement of q-profile
- 2000 (1st January) Exploitation of JET under EFDA
JET Facilities operated under contract by UKAEA
(31st May) First experiment under EFDA
- 2001 First alpha simulation experiments
- 2002 ITER Normalised confinement, density and shape achieved
Material migration studies using Quartz Micro-Balance
- 2003 Real-time feedback control of pressure and current profiles simultaneously
Hybrid regime established and extended towards ITER conditions
ELMs moderated with impurity seeding
Trace Tritium Experiment campaign
- 2004 New divertor and about 16 new diagnostics being installed
ITER-like ICRH antenna under construction



"Experiments at JET, Europe's leading fusion facility based in Culham, Oxfordshire, have now shown that it really is possible to create the temperatures needed for fusion, and hang on to them."

Sir David King, Chief Scientific Adviser of UK government, in New Scientist, 10th April 2004

JET Anniversary



The 25th Anniversary of the Laying of the JET Foundation Stone and the 20th Anniversary of the Official Opening of JET are celebrated in Culham Science Centre on 20th May 2004. We are proud that the event is taking place under the Patronage of the European Commissioner for Research, M. Philippe Busquin:

"Fusion is the European research programme par excellence. The reason is that other organisations, apart from the EU, are not in a financial position to make the necessary large investments, and such research has no immediate commercial impact. This is primarily a political decision, and the EU has taken it. For 40 years, the European fusion programme has been the most successful in the world with, in particular, achievements being made by the JET facility at Culham in England. Europe is therefore at the cutting edge regarding plans for ITER."

