On 1st November, the JET ‘Trace Tritium Experiments’ (TTE) Campaign was brought to a successful conclusion. This Campaign marked the first use of tritium in JET Plasmas since the Deuterium Tritium Experiment No 1 (DTE1) Campaign in 1997, and the first use of tritium in experiments under the EFDA organisation with the UKAEA as Operator of the JET Facilities.

The experiments in TTE used tritium injected into the plasma either via the gas introduction system or in the form of high energy neutrals from the Octant 8 Neutral Beam Injection (NBI) system.

The fraction of tritium in the plasma was kept at ‘trace’ levels, i.e. <1-2% of the deuterium majority fuel. Some 25 experimental proposals produced data during the TTE, which began on schedule on 29 September, after a week of commissioning. The physics experiments performed in TTE utilised the fact that the injected tritium is highly reactive (~300 times more reactive than deuterium) and that the 14MeV neutrons emitted when the tritium ions react with the majority deuterium ions ‘tag’ the movement of the tritium particles. It is thus possible to follow particle transport of a fuel ion, something that is remarkably difficult to do in a ‘normal’ deuterium plasma. Derek Stork, Leader of EFDA-JET Task

Figure 1: Time development of spatial profile of 14 MeV neutrons (from D-T fusion) produced following a 5 mg tritium puff into a 2.4T/2.0 MA low triangularity ‘Hybrid scenario’ JET pulse.
Force DT, who co-ordinated the Campaign said, “The use of tritium in this precise, diagnostic, manner will yield valuable information on the way in which fuel will be confined and transported in a fusion reactor, and also the way in which high energy tritium can provide plasma heating.”

Experiments on particle transport studied the rise and decay of the spatial distribution of the 14 MeV neutrons emitted from the D-T reactions when tritium gas or fast tritium NBI particles were introduced (see figure 1). Another set of experiments addressed particular behaviour of fast particles in the plasma (from the NB injected ions and from ions undergoing RF acceleration) – issues which will be important in a next step device. The spatial distribution of fast tritons (tritium ions) accelerated by the JET Ion Cyclotron Radiation Frequency (ICRF) system results in an off-axis peak in the neutron emission as shown in figure 2.

The amount of tritium injected into any single discharge during this month-long experimental campaign was minute – only up to 5mg per discharge. “Although the tritium is injected in such small quantities into the plasma, it is supplied to the machine in gram quantities then recovered and recycled within the system”, explained UKAEA’s Tim Jones, who led the team undertaking the technical preparations. “Establishing this tritium supply and reprocessing capability is nearly as demanding as providing the fuelling for a 50:50 Deuterium-Tritium (D-T) plasma. So, in this sense, the UKAEA team has done ~ 90% of the work needed for JET to enter full D-T operation.”

Over 500 JET discharges were run in the TTE Campaign, and over 160 of these were supplied with tritium. These were split roughly 50:50 between tritium introduced in short (100 ms) gas puffs and tritium introduced in short NBI pulses up to 300ms long. About 380 mg of tritium in total was introduced into the JET plasmas. The machine down-time in the Campaign compared very favourably with other non-tritium Campaigns, and in particular, there were no significant faults on the tritium systems themselves.

The Scientific Co-ordination for the experiments came from staff in nine of the EFDA Associations. The re-establishment of a ‘full quota’ of 14MeV neutron diagnostics on JET was one of the most important side benefits of this Campaign, led by teams from ENEA (Italy), VR (Sweden) and UKAEA. As part of this effort there were also tests of detectors for 14MeV installed by Russian Specialists. This signified their first active participation in JET campaigns and more such visits are planned.

Following the Campaign, a successful set of ‘Clean-up pulses’ have been run, reducing the background tritium levels in the plasmas to ~0.005%, in preparation for Campaign C12 which began on 25 November. This Campaign concentrates on deuterium plasmas with high power heating, bringing into use the final stage of the upgraded NBI power supplies.
Joint experiments on DIII-D (General Atomics, San Diego, California) and JET have obtained a result that indicates that ITER might perform better than the baseline design assumption.

The experiments have measured the dependence of the energy confinement on $\beta_N$, the normalised ratio of the plasma’s kinetic and magnetic pressures. They were done in similar “ITER relevant” discharges. The $\beta_N$ dependence helps to distinguish whether turbulent transport is primarily electrostatic (no $\beta_N$ dependence) or electromagnetic (unfavourable $\beta_N$ dependence), and strongly affects the optimisation of fusion in a burning plasma. The $\beta_N$ values of both the edge and core regions were scanned by varying the neutral beam heating power.

Both DIII-D and JET found the beta dependence of confinement to be weak, possibly non-existent, which favours electrostatic theories of turbulent transport. As a consequence, the fusion performance (proportional to the product of $\beta_N$, confinement time and the square of the magnetic field, normalised to the facility size) increased with increasing $\beta_N$ on both DIII-D and JET, as seen in the figure. Since one of the more commonly used predictions for fusion plasmas contains a strong, unfavourable $\beta_N$ dependence, this new result indicates that ITER could perform better than the baseline design assumption if operation at a $\beta_N$ above the nominal value of 1.8 can be achieved. Future experiments should build upon these results and provide an improved predictive capability for ITER performance over a wider range of operational parameters.

Based on APS Press Release from 2003 Annual Meeting of the Division of Plasma Physics, Albuquerque

Neutral Beam power upgrade brings key ITER plasma parameters closer to JET’s reach

The enhancement of the Octant 8 Neutral Injector Box (NIB) on JET is a major project that started in 2000 with the aim of providing a substantial increase in power delivered to the plasma.

JET’s large size together with its high plasma current capability (=4.5MA) and magnetic field (up to 4T) provide the ability to confine fusion plasmas at high pressure (the product of temperature and density) and high total stored energy within the large plasma volume. This gives a unique possibility to get as close as possible to ITER plasma condition. Neutral Beam Heating, either alone or in combination with Ion Cyclotron Resonance Heating, is a very effective method of raising the plasma...
Neutral Beam Heating: Injection of a beam of fast neutral particles, which become ionised in the plasma and heat it as they slow down. The large physical size of the JET tokamak gives a unique possibility in fast particle research in fusion plasmas to get as close as possible to an ITER-relevant scenario.

The new crowbar for the upgraded power supply

The contract for design, manufacture and installation of the new HVPS modules was awarded to the company JEMA (Lasarte Oria, Spain). This highly modular design uses all solid-state technology, with all the controls and regulation on the low voltage side of the high voltage isolation transformers. Delivery of the equipment of the new HVPS modules commenced in January 2003, with the complete system installed in a new bespoke building. Shown in the photograph are some components of the new power supplies. Each of the two new HVPS modules is rated for operation at 130kV/130A, and feeds a pair of 130kV/60A PINIs connected electrically in parallel.

Before the upgrade, the Octant 8 NIB was equipped with eight Positive Ion Neutral Injector (PINI) beam sources, rated for operation at 140kV acceleration voltage, and 30A extracted deuterium ion beam current. The upgrade has involved modification of the accelerator components for operation at 130kV/60A. These eight upgraded PINIs were installed on the Octant 8 NIB during the 2001-2002 JET shutdown (see EFDA Newsletter, September 2002).

In parallel, other beam-line components were upgraded in order to handle the extra power. To operate the new PINIs, a major re-configuration of the main High-Voltage Power Supplies (HVPS) was required. Following this, four of the eight upgraded PINIs were brought into operation during 2002. To operate the remaining four PINIs, two new HVPS modules were procured.

The extra power is required to extend the range and achievability of key plasma operating parameters, especially in regimes with high plasma current, magnetic field and density. This will enable JET to study a wider range of fundamental plasma parameters that determine the underlying confinement behaviour. In particular, the normalised plasma pressure (relative to the magnetic field strength), the ratio of the plasma dimension to the particle orbit size and the collisionality (a measure of the interaction between the particles) will approach even closer the values expected in ITER.

The upgrade will also provide extra flexibility, for example, the possibility to compare the effect of different beam injection characteristics (energy, fuelling rate, momentum input) at higher levels of heating power.

Following installation, both new HVPS units were fully tested on a dummy resistive load, and the complex system of controls, protections and interlocks were progressively integrated into JET’s centralised Control and Data Acquisition System (CODAS). Following exhaustive dummy-load and off-load integrated testing, the first of the new HVPS modules was connected to PINIs 1 and 2 on the Octant 8 NIB on the evening of the 23rd of July, 2003, and the production of the first beams successfully took place the following day. By the end of the scheduled JET re-start period, the PINIs connected to the first new HVPS module were ready for the first day of the C10 campaign on the 18th of August 2003. The final pair of PINIs, fed by the second new HVPS module, were brought into operation at the beginning of November 2003, increasing the available neutral beam heating power to >23MW for campaign C12 which started on the 24th of November.
The Hybrid Scenario in JET: A promising route for ITER with \( Q = 10 \)

In 2003 the JET Task Force S2 started the detail studies of a new plasma regime, now known as “the ITER hybrid scenario”. In these plasmas, the central value of safety factor \( q \) is kept just above one with very low magnetic shear – a “hybrid” between the standard sawtoothing H-modes \( q \) profile (with central \( q < 1 \)) and the reverse shear scenarios used for creation of the internal transport barriers. The hybrid scenario, first observed at ASDEX Upgrade (AUG) in 1998 provides a very promising route to ITER long pulse operation and component testing.

The JET experiments focused on enhancing the existing database of hybrid scenario towards ITER parameters. First, the hybrid scenario performance have been successfully verified up to \( \beta_N = 2.8 \) at low toroidal field \( (1.7T) \), with plasma triangularity and normalised Larmor radius \( (\rho^*) \) corresponding to the AUG discharges. Stationary conditions are achieved with the figure of merit for fusion gain \( (H_{89.5}^* \beta_N^3 / q_95^2) \) reaching 0.42 compared to the ITER target of 0.4 at \( Q = 10 \). The characteristics of this mode observed on AUG have been confirmed in the identity experiment at same \( \rho^* \) and \( \beta_N \). In addition, in the recent Trace Tritium campaign, the regime has also been validated at toroidal field 1.7T with an ITER-like plasma shape with trace tritium injection to assess the transport properties of the fusion fuel in this regime.

The next experiments are now aiming at decreasing the normalised Larmor radius \( \rho^* \) towards projected ITER values. An intermediate step has already been successfully reached last September at a toroidal field of 2.4T demonstrating the potential of the hybrid scenario. Making use of the upgraded JET NBI heating system, experiment up to 3.1T and possibly 3.4T will follow to prove that the hybrid scenario can be achieved at lower \( \rho^* \). The ultimate goal is to establish the scenario at toroidal field 3.4T using the ITER-like plasma shape. At this field the scenario will be in the range of \( \rho^* \) achievable in ITER.

With its size, field and improved heating capabilities, JET is the unique facility to assess the portability of plasma scenarios for ITER. The work on the hybrid scenario in JET is a typical example of the route to follow towards the validation of plasma scenarios for ITER.

![Graph showing performance of ITER and JET with enhanced power](image-url)
The 2004 JET shutdown will be the most challenging yet for the JET remote Handling Group, involving close to 200 individual tasks, most of which are implemented remotely.

It became obvious some time ago, that the way in which the remote handling operations team prepares for shutdowns had to evolve to cope with the variety and volume of in-vessel remote handling tasks. As each in-vessel shutdowns became ever more challenging, a new methodology for developing remote operations task was required.

This change to the way we develop remote in-vessel tasks has a number of key elements including the development and introduction of a new electronic Operations Documentation System (ODS), a replacement and upgrade to our Virtual Reality system and the introduction of a new methodology for operational task development and approval.

The first significant in-vessel remote handling shutdown was the replacement of the JET Divertor in 1998, where we prepared for 38 remote tasks including the replacement of the divertor over a period of 15 weeks. Each task was developed by one of the 4 operations engineers using the In-Vessel Training Facility (IVTF), and writing ‘Task Plans’ and their accompanying ‘Procedures’. Only one team could use the IVTF at any one time, often for weeks, so this became the ‘bottleneck’ in developing tasks. It also required the manufacture of full size prototypes of proposed component and tooling designs. As a rough estimate, it took between 2-3 times the length of shutdown to develop the remote operations tasks.

Since then there have been two more remote handling shutdowns, each with a growing volume and complexity of remote tasks to be implemented.

In 2000, the remote handling group started a number of projects to examine its existing methodology for operational task development, with the following aims:

- Reduce the time required to prepare remote operation tasks
- Allow concurrent development of several tasks simultaneously
- Simplify and where possible ‘standardise’ the development of remote handling operation documentation.

This identified the benefits of a new Virtual Reality (VR) systems and development of the ODS.

The main requirements of the new remote handling VR system were defined as:

- Should provide adequate detail to accurately simulate remote handling equipment within the JET Vessel and IVTF, allowing thorough validation of new tooling and component design within tight timescales. (Virtual mockup).
- Enable simultaneous remote operations task development by 5 people.
- Enable real-time monitoring of an 18 degree-of-freedom robot including collision detection.
- Integrate with the RH Operations Documentation System (ODS).
Although VR had been used at JET for some years, its use was restricted to ‘Boom monitoring’ due to its inability to translate and use CAD models from the JET drawing office. All modelling had to be done within the VR program via typed in co-ordinates. This meant the models used were simplistic but adequate for Boom monitoring.

A prime requirement for the new VR system was therefore established that it should be able to access the JET database of over 70,000 CATIA models.

### VR system ‘Modes of Use’

To meet its requirements, the new VR system would have two modes of use within the remote handling group, ‘on-line’, for real time monitoring of the Boom and ‘off-line’ for development of remote handling procedures.

**On-line ‘real-time’ monitoring:**

In this mode, the VR system is connected to the actual robot controllers and receives positional data around 100 times a second. During shutdowns, the ‘Boom driver’ uses the VR simulation to monitor Boom movement in-vessel as shown if Figure 1.

To facilitate this mode of use it is essential to maintain a system response (for the VR system) of >5 frames /second (fps), if one is not to view events after they have occurred. This has meant that the in-vessel simulation used for on-line monitoring must have ‘light-detail’ while still accurately representing the space volume of in-vessel components, tooling and Remote Handling (RH) robots. The system must also be easy to use by the RH operators taken from the workshop staff.

**Off-line RH Task Development:**

In this mode of use a simulation is required which defines the vessel environment, new components and tools in ‘full-detail’, including nuts and bolts. The simulation can contain complex ‘behaviours’ to allow the operation of tooling and movement of components (installation/removal) to be simulated. New component (diagnostic systems etc) and tooling designs are supplied as ‘Library files’, which can be referenced internally by the VR system. As the design changes in the JET drawing office, so these VR ‘library files’ are updated.

RH operations engineers use these detailed simulations to evaluate new component and tool designs for ‘remote handling use’ and to prepare operational procedures. All information produced is input into the ODS system for detail task preparation.

*Stephen Sanders Remote Handling Engineer with responsibilities for VR JET - UKAEA 1 – On contract from Oxford Technologies Ltd*
Successful start of collaborative activities with the Russian Federation and the People’s Republic of China

EFDA-JET has long-standing collaborations with scientists from the US and Japan and during 2003 added the Russian Federation and the People’s Republic of China to its list of international collaboration partners. Twelve Russian scientists visited EFDA-JET between 15 September-19 December 2003. Their work amounted to about one year of effort in the six areas:

i) installation of natural diamonds detectors for fast neutron flux measurements (Andrei G. Alexeev, Anatoli V. Krasilnikov),

ii) installation of an organic scintillator for neutron spectrometry (Yuri A. Kaschuck, Aleksander Aleynikov),

iii) improved analysis of neutral particle analyser data (Valeri I. Afanasyev, Maksim I. Mironov),

iv) modifications to the gamma spectroscopy system for use in high-performance plasmas (Igor N. Chugunov, Alexander E. Shevelev),

v) studies of scrape-off layer flows (Leonid N. Khimchenko, Gennadii S. Kirnev) and

vi) studies of electron-channel transients (Valeri F. Andreev, Natali A. Kirneva).

The visits were highly successful and further collaboration during the Experimental Campaigns of 2004 is under discussion. In addition, the first collaboration with the Peoples Republic of China began in late November 2003 when the Chinese scientist Dr. Xuantong Ding started a three month visit. Further visits of Chinese scientists are under discussion.
The EIROforum, a co-operation between seven European Intergovernmental Research Organisations, which began three years ago as an informal discussion forum, is now becoming a major player in developments of the European Research Area. EFDA JET, as one of its members, is playing a key role in this process since Dr Jérôme Paméla, EFDA JET Associate Leader, assumed a one year chairmanship of the EIROforum Assembly this July. On 27th October, the European Commission represented by European Research Commissioner Philippe Busquin and the seven EIROforum member organisations signed a “Statement of Intent” to develop European Research Area (ERA). The ERA project was launched at the European Council at Lisbon in March 2000 in the context of making Europe's economy the leading knowledge-based powerhouse in the world. As world leaders within their respective fields of science, the seven member organisations of the EIROforum confirmed their commitment to developing ERA.

“EIROforum organisations, in collaboration with the European Commission, will play a decisive role in promoting the quality and consistency of European research. This is a concrete example of the European Research Area in action, for a more competitive EU and better quality of life for our citizens,” said Commissioner Busquin.

“We are signing for a common strategy on science and technology in the service of society,” highlighted Dr Paméla. “With our facilities, EIROforum can play a unique role in supporting the policy of the Commission. Working together in the ERA, our ever increasing scientific knowledge will certainly lead to untold benefits.”

EC-EIROforum Statement of Intent being signed in Brussels on 27 October 2003. From Left to right are C. Carlile (ILL), L. Maiani (CERN), C. Cesarsky (ESO), P. Busquin (Research Commissioner EC), J. Paméla (EFDA-JET), W.G Stirling (ESRF), J.J Dordain (ESA) and F. Kafatos (EMBL)

On November 8th the biggest EIROforum science fair began - the one week “Physics on Stage”, an opportunity for science teachers from all Europe to share ideas. This year, the event was hosted by ESA at Noordwijk in the Netherlands. In his welcome address, Dr Jérôme Paméla highlighted the role of EIROforum and introduced all its members. Physics on Stage was officially declared open by His Royal Highness Prince Johan Friso of the Netherlands.

In it’s four year history, Physics on Stage has evolved into a traditional European workshop for all teachers that aim at making physics more attractive to pupils and students. The Noordwijk international event represents only the summit of many similar fairs of ideas, organised at national levels. In future, the undertaking is planned to evolve into Science on Stage.

Thanks to the fact that Physics on Stage was run under the auspices of EIROforum, teachers had unique opportunity to learn of recent progress directly from its member organisations. For EFDA JET, Dr Peter de Vries gave a talk “Harnessing of Fusion Energy” which followed the now famous “fusion roadshow” developed by FOM and presented by Prof. Niek Lopes Cardozo, the Royal / Shell prize 2003 winner. Both presentations succeeded very well with the audience of more than one hundred teachers and journalists and inspired following discussions.

For more information:
EIROforum:
http://www.eiroforum.org
European Research Area:
http://www.cordis.lu/era/
Physics on Stage:
http://www.physicsonstage.net

A snapshot from Physics on Stage 2003 Photo: ESA
Keep JET Operating

You have moved from a field (particle physics) in which the programme is driven by scientific curiosity. Should fusion be mainly science driven or mission oriented?

Fusion research must be primarily and increasingly focused on producing an economically viable fusion power plant as soon as possible. At Culham we are studying the critical (fast-track) path to fusion and identifying the risks and uncertainties. The result will form the basis for our future programme, and our input to planning the European programme. That said, fusion is not yet totally in a development phase. Some oxygen must be reserved for new ideas, and it’s good that the scientific and technological challenges are sufficiently exciting to continue to attract outstanding people.

University-based scientists currently do not play a key role in JET. Should JET in general and UKAEA in particular be working harder to change this situation?

A stronger university base would underwrite future recruitment of the engineers and scientists needed to drive fusion forward, and would also generate better understanding of the potential of fusion and the progress made. We are encouraging British universities to become more involved in the fusion programme generally. I do not expect a dramatic increase in plasma physics, but I hope for much greater involvement of material scientists – we need their help in tackling the materials issues that lie on the critical path to viable fusion power plants.

What do you see as the main differences between JET and CERN, where you were Director General?

In 1999, I gave a talk at Culham on how CERN operates as a user facility, and the present mode in which JET is operated is, to some extent, modelled on CERN. The main difference is that experiments at JET are intimately integrated with each other and with JET itself. Experiments at CERN are fed by the same accelerator, but are operationally independent, and are constructed by independent consortia of physicists and engineers from laboratories (which usually include CERN) and universities from around the world (including some 40% from outside Europe).

Do you support continued operation of JET as a key asset in preparing for ITER?

JET is the most advanced tokamak in the world. I consider it vital to keep JET operating through most of the ITER construction phase in order to develop ITER operating modes, test ITER systems, gain more experience with tritium, and provide training opportunities at a large facility that is open to users from all EFDA countries and beyond.
Family Day Children’s Competition

The Family and Friends Day in the Culham Science Centre on Saturday September 6th was a big success, with about 1500 visitors attending. To get feedback from the younger generation (that will hopefully move fusion from experiments to real life), we asked children to write down a story or to draw us a picture of what they liked best at the Family Day. A magnetic spinning top (Levitron) was the prize incentive for the best masterpiece in each of the four categories: story and drawings, in two age subgroups.

The EFDA/UKAEA jury had a difficult time as all contributions were of a high standard. To our surprise, every second contribution was at least partly referring to the Liquid nitrogen stand, presented by Andrew Cullen from UKAEA. As expected, JET was another highlight.

On Friday 14th November, the four winners arrived at JET to collect their well deserved prizes: Deborah O’Brien (13 years) for best drawing and Veronika Valovicova (12 years) for the best story in the 11-14 years category, Federico Pasqualotto (8 years) for the best drawing and Hannah Pearce (10 years) for the best story in the under 11 years category. EFDA Associate Leader for JET Dr Jérôme Paméla congratulated the winners and signed their Certificates of Acknowledgement. The four winners also met Andrew Cullen again, who was acknowledged for his success and who willingly explained to children how to spin the Levitron.

All the other children that participated were sent a small souvenir and their works, as well as those of the winners, were on exhibition in the JET foyer until recently. On this occasion, EFDA would like express its appreciation for all the efforts that the UKAEA staff invested into the remarkable Family and Friends day.

Close Support Unit in Culham

Alain Lioure, the new Head of Enhancement Department joined the Close Support Unit in Culham in August. In the same Department two new Responsible Officers, Friederic Le Guern (from CEA) and Juergen Gafert (from IPP) arrived in September.
In 2003, 61 contributions to journals have been submitted to the JET pinboard: 7 Physical Review Letters, 11 Nuclear Fusion, 33 Plasma Physics and Controlled Fusion, 5 Physics of Plasma, 5 other journals. At the same time, the contributions to conferences went to a total of 220, in particular 90 contributions to the 30th EPS Conference in San Petersburg, 27 to the 45th Annual Meeting of the Division of Plasma Physics of APS, 16 to the Topical Conference on Radiofrequency and 31 to several IAEA Technical Meetings.

Beside the normal channel for publication of the JET results within the conventional literature (i.e. Scientific Journals, Books, and similar publications), all the contributions to journals and to the major conferences have an advanced distribution as pre-publication editions (JET Preprint) on the Institute of Physics website, http://www.iop.org/Jet/main. This gives the author the advantage of a greater number of people reading his/her paper, and the opportunity to incorporate comments before the final journal version is published. In addition, JET preprint version contains all the diagrams drawn to for example a set housestyle and lineweight, with the correct reference numbers. Each diagram will also be hyperlinked back to its source file held in JET’s central diagram database (which contains over 40,000 indexed and archived figs) which allows the user to obtain the file in EPS format.

JET Events

August 18  Successful restart of JET after 3 months of planned maintenance; High Power campaign C10 starts
August 18  The new French High Commissionner for Atomic Energy, Mr Bernard Bigot, visited JET accompanied by Dr. Jean Jacquinot, Head of Association EURATOM-CEA and Mr. Jean-Paul Watteau, Science Advisor to the High Commissioner
September 4  Redesigned JET public webpage launched
September 6  Family and Friends Day in Culham – JET facilities visited by more than one thousand people, EFDA CSU presents its websites and initiates Children’s Contest
September 8  Professor Sir Chris Llewellyn Smith FRS commenced as Director of UKAEA Culham Division
September 15  Visit of Finnish Industry Delegation led by Prof. Jorma Routti (CIM) and Ambassador Pertti Salolainen (the Embassy of Finland in GB)
September 18-25  ITER NSSG Meeting at Culham
September 19  Visit of Glen Ford, MEP
September 25-26  EIROforum Co-ordination meeting at JET
September 29  JET starts campaign C11, the Trace Tritium Experiment. First tritium operation since the DTE1 campaign in 1997.
October 10  JET successfully ran an experiment with a very high toroidal field - 4 Tesla. Under EFDA, this was the first time such a high magnetic field had been applied.
October 22  CCE-FU has endorsed the Commission’s proposal to extend EFDA up to 31 December 2005
October 27  EFDA JET as a member of EIROforum has signed a joint Statement of Intent with the European Commission, confirming commitment to developing European Research Area
November 3  Trace Tritium Experiment campaign C11 ended successfully
November 14  Visit of Boris Johnson MP
November 25  JET entered High Power Campaign C12

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