

Fusion BUSINESS

MORE UK COMPANIES TENDERING FOR FUSION WORK

The EURATOM/UKAEA Fusion Industry Programme has added a further ten UK companies to the number nominated to tender for work on European fusion programmes. It brings the total number of UK companies nominated so far in 1999 to thirty.

Under European Fusion Programme rules, each Fusion Association is asked to nominate suitable companies to tender for any European fusion contract worth more than €300,000.

The latest projects include:

- Cryostat components, the gaseous helium purification system, and power supplies for the control coils, on the W7-X experiment at IPP, Greifswald, Germany
- A power supply for the Helical coil system of the TJ-II Stellarator at CIEMAT, Spain
- Diamond window discs for FZK, Germany.

More than fifty UK companies have been asked if they would like to be nominated this year. A total of 64 separate nominations have been made.

If your company would like to be included on our database for future fusion projects, please email us at: fusion.industry@ukaea.org.uk

tesla WINS GERMAN FUSION CONTRACT

The EURATOM/UKAEA Fusion Industry Programme is pleased to report that Tesla Engineering of Storrington, Sussex was successful with its tender to supply superconducting planar coils for the W7-X machine at IPP.

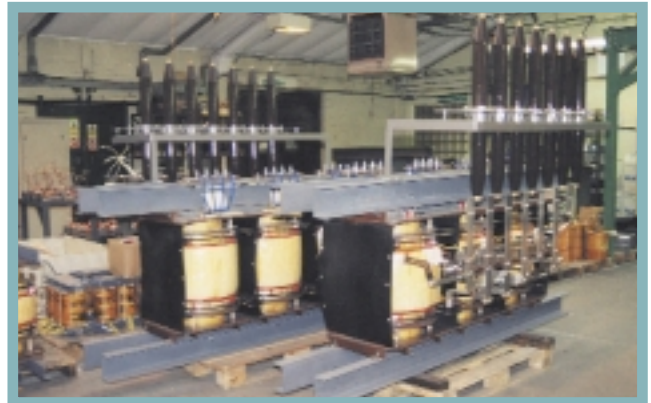
Tesla, a leading designer and constructor of conventional and superconducting magnet systems for applications in nuclear fusion, particle physics and medicines, was featured in *Fusion Business Issue Four*.

Inside..

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- Taking the long view
- AEA Technology at work on ITER
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INDUSTRY SOLUTION FOR MAST POWER

The unique requirements of high power isolation transformers for the MAST (Mega Amp Spherical Tokamak) machine at UKAEA's Culham Science Centre called for a collaboration between two UK companies and university scientists.



A TEC arc rectifier isolation transformer

Manufacturing electrical engineers, TEC, of Basildon, Essex, who had earlier developed transformers for the START machine at Culham, successfully tendered for the project.

TEC's Colin Archer says: "We were faced with a unique problem. The oil-filled porcelain bushings we used on START had reached their safe working limit; we had to cater for an increase in ac insulation voltage plus the introduction of a new dc insulation test. But CAPMART in Cinderford, Glos. came up with a special two pole paper capacitance bushing to suit our needs."

TEC then built a prototype 10kVA transformer and did a series of high voltage tests, using their own 85kV ac flash test facilities and the High Voltage Laboratory at Southampton University for the HV dc flash testing. The prototype transformer passed the tests with honours and the rest of the project was built to the same exacting parameters.

Contact Colin Archer on 01268 520 491.

TAKING THE LONG VIEW

The Fusion Industry Programme is considering a role in an exciting robotic telescope project and is looking for industry support.

Discussions are under way with the University of Bradford on funding for an £800,000 successor to its prototype robotic telescope which is bringing astronomy alive in classrooms around the country via the internet (www.telescope.org).



The telescope, sited on the Pennines in West Yorkshire (a new observatory is being built in Tenerife), can decide when weather conditions are good enough and then make observations of the sky by itself, following a schedule produced daily by special software. Astronomy students in schools, colleges and interest groups can send requests for observations direct from their internet browsers and are notified by email when the results are ready.

Dr John Baruch, Head of the Cybernetics and Virtual Systems Unit at Bradford University says: "Our aim now is to turn an academic interest into a commercial reality, bring new educational experience into the lives of many more people, and open new markets with a world-beating product."

A collaboration between the University and the EURATOM/UKAEA Fusion Industry Programme would harness expertise at the Culham Science Centre in mechanical engineering, optics design, modern materials, computer data acquisition and control systems, to help build and install the new telescope. UK companies interested in sponsoring the project or providing design or engineering staff time to help build it can email us at fusion.industry@ukaea.org.uk. Sponsors logos will be prominently displayed on the entry pages of the telescope's web site which is currently attracting 2,500 visits per day.

Details from Dr Baruch at john@telescope.org

FUSION REUNION

An occasional series featuring former Culham staff now using elsewhere skills learned in Fusion

Dr Ruth Bamford first came to Culham as a student in 1987 and worked on fluorescent scattering on the HBTX-1B machine. She was offered a PhD. at Culham and stayed on, working on the COMPASS and START machines, designing and building a new diagnostic, called omega, to measure fluid velocities; this instrument is still being used on COMPASS today.



Ruth (pictured far left during a project in Norway) says: "I learnt so many skills during my time at Culham. Working in plasma physics is exceedingly good training because it encompasses so many different areas."

Ruth now works at the Rutherford Appleton Laboratory studying ionospheric plasmas (the naturally occurring plasmas which surround the earth). She recently won an Office of Science and Technology award for a poster on tracking ionospheric changes during solar eclipses, and is currently working on a project to assess the effects of August's total solar eclipse on radio reception. Details on www.eclipse.org.uk/radio

1999 Fusion and Industry Conference & Events Diary

September 19-24 - ISFNT (5th International Symposium on Fusion Nuclear Technology), Rome, Italy.*

September 21- October 1 - International Stellarator Workshop, Madison, Wisconsin, USA.

October 5-7 - French Physical Society Exhibition, Paris, France.

October 10-15 - 9th International Conference on Fusion Reactor Materials, Colorado Springs, USA.

October 11-15 - 18th Symposium of Fusion Engineering, Albuquerque, NM, USA.

November 2-4 - National Measurement Conference '99, Brighton.*

December (dates tbc) - European Fusion Physics Workshop, Kloster Seeon, Germany.

May 22-26 2000 - Plasma Surface Interactions, Rosenheim, Germany.

*The Fusion Industry Programme will be exhibiting at this event.

Email deniese.willis@ukaea.org.uk or call 01235 463296 for more information.

A Guide to Fusion – Part 5

Power Supplies

Highly specialised electrical power supplies are used to feed the magnetic field coil systems (see *Fusion Business Issue Two*) used in fusion research experiments.

Some loads require particularly high peak powers, normally derived from banks of energy storage capacitors (typically 1–5MJ at 10–20kV) switched by spark gaps, by mercury arc switches (ignitrons), or by semiconductor devices, for load currents of up to around 50kA. In addition to these closing switches, some applications require opening switches, operating at up to 50kA dc; these generally comprise vacuum interrupters or thyristor ‘breakers’.



33kV Circuit Breaker with 200kV dc High Voltage Power Supply in the background

Other loads, particularly for the longer pulse lengths, use line-commutated transformer-rectifier units, powered from the ac mains supply, to provide the bulk of the power to the coils. These units are typically rated at about 1kV, 10–100kA and 1–50MW and employ the latest high power thyristors. Higher speed applications often use inverter type circuits (e.g. kV/kA multi-rail choppers) employing GTOs or IGBTs, or linear power amplifiers (100kW's) using transistors. These supplies frequently operate within overall plasma control feedback loops, with extensive protection features, to ensure reliable operation.

In the largest fusion facilities, the total ac power load can be very high and energy storage, in the form of flywheel generators, is used to supplement the local mains distribution system.

The design of all these power supplies is complicated by the pulsed operation required by fusion. Future fusion machines are likely to feature superconductors, requiring less power but much more sophisticated energy dumping systems.

NEWS IN BRIEF

Industry link on the web

The EURATOM/UKAEA Fusion Industry Programme is extending its efforts to help UK industry to win work by expanding its presence on the internet. The Programme's web site is being updated and is offering links to UK companies which already work in fusion or have the capability to be involved in the future.

If your company would like a link from the site, please email fusion.industry@ukaea.org.uk

Visitors Welcome

During the last year, more than 1500 people visited the Culham Science Centre to see for themselves the facilities at UKAEA Fusion and JET.

Recent visitors included representatives from UK and European companies and scientific associations who had attended the British Nuclear Energy Society seminar on Developments in Fusion Power Plant Concepts held in London.

Anyone interested in visiting Culham Science Centre should email chris.carpenter@ukaea.org.uk or call 01235 464190.

Changing Places

Louise Ball (pictured below) is leaving the Fusion Industry Programme to pursue a career within the Finance and Commercial Division of UKAEA based at Harwell.



Louise, who is currently studying for an LLB (Hons.) with the Open University, is looking forward to putting her legal knowledge into practice. She will be replaced by Miriam Mason who is joining the Industry team in August.

Enquiries about the Industry Initiative can be addressed to fusion.industry@ukaea.org.uk

Your comments on this edition of Fusion Business are welcome, along with suggestions for articles. Please call 01235 464104 or email fusion.industry@ukaea.org.uk

Views expressed herein do not necessarily reflect those of the EURATOM/UKAEA Fusion Association. No liability is accepted whatsoever for errors or omissions contained in Fusion Business. This work is funded by EURATOM and the UK Department of Trade and Industry. Visit our web site at:

<http://www.fusion.org.uk>