Issue Five February 1999

Fusion BUSINESS

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FUSION FUNDING EXTENDED

The Council of Ministers has approved the funding for Fusion in the next Framework Programme, which covers the years 1999 to 2002. This means a further four years of continued support from Euratom for Fusion, with the emphasis on a reactor-oriented programme and the exploitation of existing facilities.

This Framework Programme is expected to involve the use of the JET facilities (pictured right), given the unique role that they can play. The UKAEA is expected to have an important involvement in this, together with the other Associations in Europe.

It is proposed that the UKAEA will operate the JET facility for a collective European programme for science and technology experiments after the Joint Undertaking (under which JET is currently run) expires in December 1999.

TENDER & CONTRACT NEWS UPDATE

Two large fusion projects now being built should offer some tender and contract opportunities for UK industry.

In Germany, construction of the Wendelstein 7-X stellarator is under way, with work on the building which will house the machine expected to finish by mid-2000.

- A contract has recently been placed for the 50 non-planar coils.
- Evaluation is under way of the submissions made - including some by UK companies - following the call for tender to manufacture the planar coils.
- The list of nominees to tender for the power supplies is now complete, and the call for tenders is expected to be issued shortly.
- Later this year it is expected that pre-tender enquiries will be issued for the W7-X cryostat, with the actual call for tender anticipated for March 2000.

The second device is the KSTAR (Korean superconducting tokamak) machine at the Korean Basic Science Institute. They have asked Fusion Industry Programme staff to make preliminary enquiries among UK companies to identify potential vacuum vessel manufacturers.

We await details of other possible calls for tender and will keep readers updated in future editions of Fusion Business. For more information about these or other developments in the magnetic confinement fusion community, please call Louise Ball on 01235 464104, or email louise.ball@ukaea.org.uk

TECHNOLOGY TRANSFER -

OPENING NEW MARKETS FOR UK COMPANIES

A ten year association with Fusion Research in the UK has boosted product development and is leading to new markets for Carrera Design & Draughting Ltd.

Based at Worthing in West Sussex, Carrera first supplied thyristor power control units for lasers on the UKAEA Fusion machine, COMPASS, at the Culham Science Centre. They have since supplied JET and, in recent months, developed a version of the product for the Mega Amp Spherical Tokamak (MAST) machine at Culham.

Dr Philip Ng of Carrera says: "The higher power requirements of fusion forced an additional technical development of 60-70% - mainly on fine tuning the control and response parameters. This has been very useful to us in confirming that our techniques can be applied to higher powers, as an alternative to the more expensive and less easily controllable variable transformers." Carrera are now pursuing sales of this product in other fields.

Dr Ng says: "We anticipate that markets will develop beyond fusion and we are currently looking into applications in sputter coating, for example of metal onto plastic."

For more information on Carrera Design & Draughting Ltd., contact Dr Philip Ng on 01903 209550.

Carrera are one of a number of companies, identified during research into technology transfer, carried out on behalf of the Fusion Industry Programme. Many other companies have benefited from links with UK Fusion Research, including Dunlop, whose work on carbon-carbon composite tiles for plasma facing components was reported in Issue One of Fusion Business. Further case studies will feature in future issues.

BONAS CONSULTANCY

Technical consultancy from UKAEA Fusion staff has been helping the Bonas Machine Company - world leaders in electronic Jacquards (yarn selectors for weaving machines) - stay ahead of the competition.

The design issues of a variety of actuator concepts have been discussed, with a view to further improving the performance of the Bonas Jacquard machines. The overlap in technologies with fusion primarily concerns the requirements for long-life, highly stressed electromechanical structures.

If you feel you would benefit from consultancy with UKAEA Fusion, please contact Louise Ball on 01235 464104 or email louise.ball@ukaea.org.uk

CHAMPAGNE WINNER

Thank you to all those companies who returned the industry questionnaire in the last edition of Fusion Business.

A bottle of champagne is on its way to our Prize Draw winner, Chris Naylor Research Ltd. of Scarborough in North Yorkshire.

Your comments on this edition of Fusion Business are welcome, along with suggestions for articles. Contact Louise Ball on 01235 464104 or email louise.ball@ukaea.org.uk

BIRD & TOLE LTD.

Precision instrument engineers Bird & Tole Ltd. have now been trading with UKAEA for more than 40 years.

Marketing Manager Graham Plater says: "We supply air sampling equipment to UKAEA Fusion and other locations within the UKAEA umbrella. We carry out sub-contract engineering work for Harwell, Culham and other UKAEA locations. And we now regularly utilise the specialist knowledge of UKAEA Fusion's "Special Techniques Group" as they are a field leader."

Established in 1948, Bird & Tole are equipped with modern CNC milling and turning machines and have skilled craftsmen and a large pool of technical engineering staff among the 42 employees at their High Wycombe base.

An order in the early 70's for a highly specialized grazing incidence monochromator for the Synchrotron Radiation facility at Daresbury Laboratory was to be the first of a line of custom-built instruments designed by Bird & Tole. Other customers in this area include Brookhaven National Laboratory (USA), BESSY 1 & 2 (Germany), E.S.R.F. (France), Max-Lab (Sweden) and APS (Chicago). Bird & Tole also manufacture high precision optical sighting assemblies for the M.o.D. and Vickers Instruments.

For more information call Graham Plater on 01494 481 342.

NEW CONTACTS MADE AT CERN AND CBI

Promotion of UK companies by the Fusion Industry Programme has had further success at two major conferences.

At our stand (pictured right) for the European Laboratory for Particle Physics "Britain at CERN '98" exhibition in October, more than 20 contacts between CERN staff and UK companies were set up. Areas of UK company expertise which interested delegates included vacuum systems and steel castings, gas systems, mechanical fabrication, and control and signal-processing electronics.

The Fusion Industry Initiative was also advertised at the UKAEA stand (below) taken to the CBI Conference at Birmingham (November 1-3 '98). Contacts made there included the Civil Service industrial "Interchange" scheme, Westlakes Science Park, EA Technology and IMechE.

1999 Fusion and Industry
Conference & Events Diary

March 29-April 1 - IOP Plasma Physics Conference '99, Pitlochry, Scotland.

April 12-14 - Applications of Radio Frequency Power to Plasmas, Annapolis, Maryland, USA.

April 12-16 - IOP Annual Congress including: Vacuum Applications Expo (13/14), High Technology Recruitment Fair (15/16), Public Lectures (12-15), Salford University, Manchester.

June 14-18 - 26th EPS on Controlled Fusion & Plasma Physics, Maasticht, Netherlands.

June 30-July 4 - International Innovations Fair/BBC Tomorrow's World Live, Earls Court, London.

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

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

A Guide to Fusion - Part 3

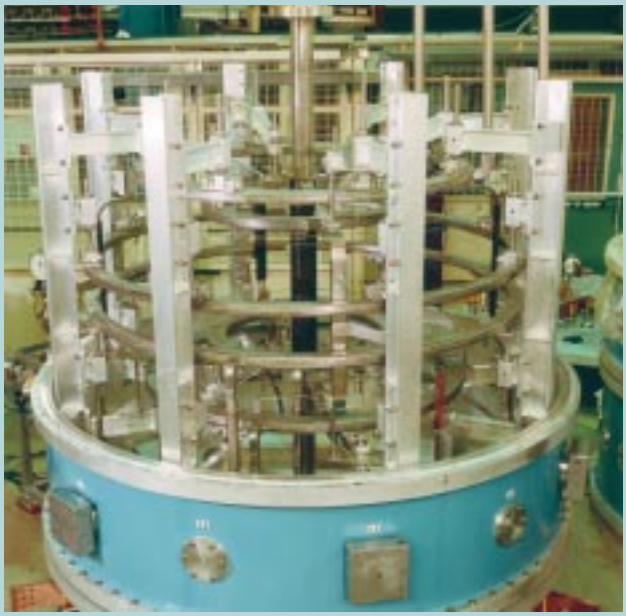
Poloidal Field Coils

Poloidal Field (PF) Coils are necessary in toroidal devices to provide good plasma confinement and stability. PF Coils run perpendicular to the Toroidal Field Coils (see Fusion Business Issue Four), and generate a magnetic field that runs around the minor cross section of the machine, similar to the lines of longitude on a globe.

The purpose of the PF coils is to determine the magnitude, shape and position of the plasma by varying the poloidal magnetic field generated by the electric current flowing through them.

They are usually made from conventional conductors such as copper and are normally water cooled to reduce power losses resulting from Ohmic heating in the conductor, and to keep the mechanical strength of the insulation (typically epoxy-glass) high.

Superconducting coils are used in some of the larger and newer machines, such as W7-X and KSTAR (see front page).



PF Coils in the START machine at Culham

Operation of the PF coils is complex. The toroidal plasmas are often positionally unstable and so are constantly monitored. The information is fed back to sophisticated control systems that vary the PF coil currents to maintain the required plasma position and shape parameters.

The PF coil system incorporates many different aspects of advanced engineering. The challenge for Fusion engineers is to harmonise the limitations of structural engineering with the stringent performance requirements of the necessary high current-density windings and high speed, high power feedback control systems.

Louise Ball

PUTTING CRANE CARE IN THE PICTURE

This picture of the largest of the PF coils being lowered into the new MAST machine at the Culham Science Centre, (Fusion Business Issue Four), put engineering specialists Crane Care Ltd. of Aston, Birmingham in the spotlight.

Established for nearly 20 years, Crane Care are among the region's top ten crane component distributors, and are celebrating a successful first year's trading since a five-figure management buyout.

Under the guidance of the Managing Director, Derek Barnbrook, Crane Care have continued to build their reputation for solving material handling problems by providing the total package in design, manufacture and installation of overhead travelling cranes, hoists and specialised handling systems, including radio control features and more recently winches.

Details on 0121 327 0444.

INDUSTRY PROGRAMME IN WRITING

An article describing some of the opportunities for industry offered through links with the UK Fusion Programme, written by Industry Programme Manager Tom Todd, is featured in the October 1998 edition of Industry Link, the newsletter for members of the British Nuclear Industry Forum.

Details from tom.todd@ukaea.org.uk