

October 2009



Welcome to the latest edition of the Laboratory Services Newsletter. I believe you will find the articles interesting and will help give you an appreciation of the types of services we offer to solve your technical challenges.

It's an exciting time at AMEC, we have restructured, which means access for clients to a wider range of Consultancy and Engineering skills. Laboratory Services is now part of the new Consultancy Directorate, so in the next edition of 'Consultancy News' we will introduce the wider range of consultancy services available

from AMEC Power and Process for the Energy market.

Until then I trust you will enjoy the articles on NIRAS' 10 years of operations, our initiatives on Health and Safety, commitment to community support and our remote operations capability.

As always, we welcome visitors to our laboratory and test rig hall facilities near Warrington to showcase our services. Please contact us to arrange a visit.

Greg Willetts
Director

NIRAS celebrates 10 years of operations

AMEC's NIRAS laboratory which provides radiochemical analysis services is celebrating 10 years of operations. The business started with six staff and some basic equipment and has now grown to be one of the largest commercial radiochemical facilities in the UK. We now conduct radiochemical analysis for a wide range of clients including nuclear operators, decommissioning contractors, contaminated land consultants, local authorities, defence establishments and the oil and gas industry. Our services are a critical component in achieving the UK nuclear decommissioning programme as we analyse samples from all UK decommissioning sites.

From conception we have always put high quality as our central principle and we are proud of our record for producing high quality results that clients can have confidence in and rely on. We have an open book quality policy where we welcome external auditing to show off the skills of our staff and our systems.

As we have grown we have continued to invest in the latest laboratory equipment, facilities and systems to improve the service to our clients. We can now handle activity levels ranging from free release to intermediate level wastes.

As our portfolio of work has expanded we have spread best practice across our clients and we believe our clients benefit from our wide experience.

We have begun the next phase of NIRAS evolution by linking more closely with our AMEC colleagues to provide additional skills and services to our clients such as radioactive site sampling teams, bespoke sampling tool manufacture, physical testing, waste management and radiological services. This enables AMEC to provide a complete sampling, analysis, characterisation and advice service.

Thanks for all the support from our clients over the last 10 years.

Continuous improvement in health and safety

2008 was a record year for AMEC. One in which we achieved our best ever health, safety and environmental performance. Our next challenge is to improve our performance throughout 2009.

To assist with this continuous improvement, AMEC has developed Six Safety Essentials - designed to

address the main causes of our Lost Time Incidents. Incidents from the last two years were reviewed, common threads identified and Six Safety Essentials implemented to support the safe execution of work in all our operating locations.



Always take care



Follow the rules



Do a risk assessment



You must intervene



Manage any change



Wear the correct PPE

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Laboratory refurbishments

AMEC continues to invest in the ongoing refurbishment of its Birchwood laboratory facilities.

This includes a new area dedicated to waste encapsulation studies. We have upgraded and extended our materials characterisation laboratories, including a Malvern Particle Size Analyser and a Thermogravimetric Differential Scanning Calorimeter.



'A simulating experience'

In the nuclear industry, for reasons of practicality and to reduce the cost to our clients, simulants (materials of a representative nature to the original) are used in laboratory and physical tests to prove process plant operations, support safety cases and aid design of new facilities. In early 2008 AMEC identified up-coming opportunities and we decided to consolidate some existing laboratory tests and develop capability in new areas into one dedicated facility. We now offer a wide range of tests which allow us to characterise Client materials, develop replacement simulants for these materials and to provide a wide range of standard, novel and where the Client needs, bespoke physical property tests.

The tests available include solids content densities, liquid and plastic limits, permeability, yield stress / shear strength, particle size analysis and morphology, rheology, consolidation and settling behaviour. Further capabilities are continually being added. Our Laboratory is able to work on both non-active and active materials i.e. small samples of the original material which bulk simulant is being produced to replicate.

This facility has been increasingly utilised through the year for Sellafield Limited, Magnox and the UK nuclear market and is available for other areas of AMEC operations on sludge like materials, such as oil sands.



Facilities and major equipment

Materials / Chemistry Laboratory (MCLR)	General Engineering Laboratory (GEL)	Development Laboratory (210C)	Summary of major technical / analytical equipment	
<ul style="list-style-type: none"> ■ Area 1000m² ■ Radiochemical Analysis Laboratories ■ Facilities for handling radioactive materials 	<ul style="list-style-type: none"> ■ Area 600m² ■ Crane 3.5 tonnes ■ Pit 25m² x 4m deep ■ Hook Height 19m and 15m (floor) 	<ul style="list-style-type: none"> ■ Area 600m² ■ Mechanical Workshops ■ C&I workshops ■ Materials, Chemistry, Corrosion Laboratories ■ Waste Technology Laboratories ■ Decommissioning Laboratories ■ Gloveboxes (incl active) ■ Radiation Shielded Cells (end '08) ■ Facilities for handling radioactive materials 	<ul style="list-style-type: none"> ■ Active and inactive laboratories including a wide range of gloveboxes ■ Unique High Temperature Oxidation Facility ■ VSR High Pressure CO₂ Loop ■ Strategic AGR Flow models ■ Core graphite/RACSC support rigs ■ 250 tonne Shenck servo-hydraulic test machine ■ UK Commercial Nuclear Reactor archive ■ Scanning Electron Microscopes (SEM) ■ X-Ray Diffraction machine (XRD) ■ Fourier Transform Infra-Red Analyser (FTIR) 	<ul style="list-style-type: none"> ■ Malvern Particle Size Analyser (active & non-active capability) ■ Thermogravimetric Differential Scanning Calorimeter (TGA/DSC) ■ Gamma Spectroscopy ■ Liquid Scintillation Counting ■ Alpha Spectrometry ■ Gross Alpha / Beta ■ Mass Spectrometry ■ Active and inactive laboratories including a wide range of gloveboxes ■ Unique High Temperature Oxidation Facility

Technical achievements

Load testing of External Steel Restraint

As part of British Energy's Boiler Closure Unit (BCU) work programme, AMEC were awarded a contract to build and test an External Steel Restraint (ESR) which is a secondary safety device designed to fit over the BCU.

The contract incorporated the design and build of the test apparatus, conducting the test itself, analysis of results and delivery of a report.

The rig (designed by AMEC and subject to Finite Element Analysis prior to manufacture) had an outer ring of studs mimicking those on the BCU and a

hydraulically actuated central table to provide up to 2,500 tons of up-thrust.

The rig frame, constructed mostly of 30 mm thick plate, weighed around 12 tonnes and required over a kilometre of weld to fabricate.

Main load testing was completed in July 2008, with the ESR subjected to a maximum load of 2,500 tonnes force. The photograph shows the ESR mounted on the rig ready for testing.

The instrumentation fitted to monitor the test consisted of 136 channels, comprising: 114 strain gauges, 17 displacement transducers and 5 pressure transducers.

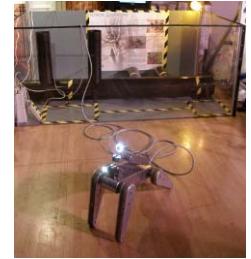


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Discovering ROVs

AMEC exhibits stand at 2009 Cheltenham Science Festival

The stand featured two Remotely Operated Vehicles (ROVs). For demonstration purposes, each ROV negotiated an assault course. Members of the public were invited to tackle the assault course with the ROVs. Specially commissioned 'Nuclear Robotics' T-shirts were printed for the event, and distributed to all those who attempted the assault course.



Remote inspection of fire-damaged plant



In June 2009 AMEC were approached to provide remote inspection of a fire damaged plant.

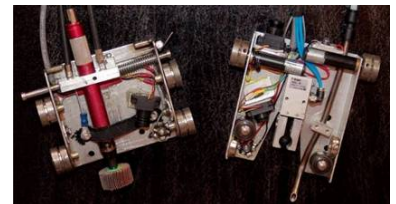
The plant had been undergoing a major refurbishment until a fire broke out, virtually destroying it. A primary inspection was required to establish the structural integrity of the plant. The purpose of the non-manned inspection was to determine the potential for safe man-access and to gather intelligence to assist with the investigation of the fire.

Inspections were carried out using one of our ROVs, kitted out specifically for the task, and also a CCTV deployment boom to access higher areas not possible to reach with an ROV

Remote ultrasonic probe installation into active plant

At very short notice AMEC were requested to remotely install ultrasonic probes into a constricted section of plant.

Our team successfully developed, demonstrated and deployed two ROVs, in addition to preparing all the necessary documentation to cover deployment, all within 5 weeks.



AMEC operators successfully used the ROVs to remotely install 96 UT probes down a narrow (~40mm) annular gap.

Community support and development

AMEC hosts two-day Tritium Users Group meeting

The 9th meeting of the Tritium Users Group (TUG) was held at AMEC, Birchwood on 30 June and 1 July. The TUG was originally initiated in 2003 by AWE to share knowledge and experience on tritium technology within the UK.

Successive meetings rapidly grew from being mainly AWE and UKAEA as participants, to most UK organisations with an interest in tritium. The current meeting also included **Babcock Marine, Environment Agency, ERS Technology, GE Healthcare, University of Southampton, Magnox North, National Physical Laboratory, Nuclear Technologies, Nuvia, Sheffield University, WMT**, as well as **AWE** and **AMEC**.

The meeting was jointly sponsored and organised by AWE and AMEC. The presentations covered a wide range of topics including:

- Facilities description
- Decommissioning
- Regulatory issues
- Medical applications
- Theoretical studies
- Experimental work and results
- Tritium measurement and monitoring
- Radwaste
- Plant operation

AMEC was well represented with respect to presentations at the meeting. We gave four presentations:

- Theoretical studies of tritium migration through metals
- Analysis of tritium in metals
- Measurement of tritium in sodium
- Operation of a detritiation plant for tritium removal

An AMEC laboratory and engineering facilities tour was conducted, which raised considerable interest.

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AMEC participates in 'lab-in-a lorry' event

AMEC was represented by one of its STEM Ambassadors when 'Lab-in-a-lorry' (LIAL) came to Great Sankey High School in July.

LIAL was originally instigated by the IoP to encourage young people's interest in science at an early age. STEMNET now use the facility in schools throughout the UK.

There were three experiments available during the day, and several groups of young learners took advantage of the facility. The experiments were:

1. Oil extraction simulation: where students explored concepts such as viscosity, density, pressure, and surface tension.
2. Sound and frequency experiments: where students learnt about the nature of sound and investigated resonance using a wine glass.

3. Light scattering: where students investigated the different colours of light that make up the visible spectrum, and explored light scattering by particles and polarisation.



Go4SET

Over the last 10 weeks, a group of Year 8 Students from Sale Grammar School have worked on a project to investigate the use of energy in their school. Chris Owen, a Fuel Route Engineer from the Reactor Services business, has acted as their company mentor. This involved weekly visits to the school to help the students run their project and prepare for the assessment day.



Chris said *"I encouraged the team to think about the steps involved in their project and to produce a plan. Although they didn't quite manage to keep to the timescales, this helped them focus on the work needed to complete the project. The team appointed a project manager and were soon running progress meetings complete with minutes and actions."*

The brief for the project was to investigate the use of energy in their school. The team considered a range of factors, such as transportation to and from school, the types of boiler used in the central heating system and the insulation provided by the doors and windows. They looked at both the environmental impact of the energy being used, and the cost to the school.

One of the responsibilities of the mentor was to organise a company visit for the team, so in May, the students took a tour of the radiochemistry labs and the engineering blocks at Birchwood. This was a great opportunity for them to see the type of projects that a 'real life' engineers can get involved in.

One of the challenges for the students taking part in Go4SET is that they are not used to working on projects over this length of time. The main role of the company mentor is to help the team with the project management of their work.

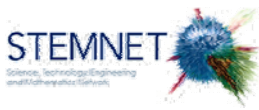
At the end of June, the team attended the Go4SET Completion and Assessment Day at the University of Manchester. They presented their work to panel of assessors, made up of representatives from **Atkins, Balfour Beatty, Jaguar-LandRover, United Utilities and AMEC** - and answered questions about the project. It was great to see them all enthusiastically contributing in a well prepared presentation.

The Go4SET project provides valuable benefits for all involved. The students have experienced working on a long term project and also gained an insight into the work done by scientists and engineers. The project has proved to be an excellent development opportunity as Chris works towards Chartered status with the Institute of Physics.

John Male Head of Learning and Capability at Power and Process Europe said; *"it is great to see AMEC promoting science and technology in the local community and supporting the national skills agenda of improving uptake in school's of STEM subjects."*

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AMEC representatives attend regional STEM Ambassadors celebration



The main aim of STEMNET is to ensure that more young people in the UK make a choice to enter science, technology, engineering and

mathematics (STEM) related careers at all levels. This extends to ensuring that future generations are properly informed about the science and technology that surrounds them and give them a sound appreciation of it.

This is achieved in two ways:

1. By bringing science, technology, engineering and mathematics activities, experiences and excitement into classrooms throughout the UK, enhancing and enriching the national STEM curriculum.



2. By linking those companies and other organisations that employ STEM educated people, and schools, in such a way that young people can get a clear idea of the diverse and exciting range of careers available to them.

Ambassadors visiting schools and providing the inspiration to potential STEM students are the main way in which these two aims are achieved, and the evening at Daresbury provided an opportunity to network with other ambassadors and share ideas and experiences.

There were also some fantastic presentations given by the STEMNET NW regional co-ordinator, the Chief Executive STEMNET, plus representatives from industry and schools addressing the main issues of the scheme right up to the government level.

Capability benefit

Import Licence

NIRAS has always endeavoured to meet our client's requirements. As part of this process we have just renewed our FERA import licence which allows the import of low level radioactive samples from various countries around the world.

The licence was originally acquired in support of an environmental monitoring programme but soon the demand to support both the oil and gas market and decommissioning market meant that the renewal of our import license was essential.

Our team of experts are able to advice on legislative requirements including transport guidance, appropriate packaging, as well as the usual technical support and best practise guidance.

Recruitment is the key to future success...

AMEC is always keen to hear from qualified, enthusiastic people looking for a challenging opportunity. If you would like to apply for a position, please view our official website for current vacancies and further information:

www.amec.com/careers

Careers

"Joining AMEC gives you a fantastic opportunity to explore different career paths and different avenues."

Nick Walters, Operations Manager, Power and Process



If you would like more information or wish to comment on any of the issues within this document please contact: AMEC

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