

# North West Regional Committee Inquiry – The Future of the Nuclear Industry in the North West

## North West Universities Association – January 2010

### Summary

- North West Universities have a truly world-class offering in terms of both research and teaching provision for the nuclear sector.
- The aim of this submission is to illustrate the current role of the region's higher education institutions and the future role they will be able to play to underpin the growth of this sector in terms of
  - Research
  - Skills
  - Collaboration with partners and working with business
- The submission shows that the University sector in the North West is well positioned to support the nuclear industry in the region, and would welcome any incentives or assistance that could be provided in this endeavour.

### Introduction

1. The North West of England has the strongest higher education sector in England outside of London and the South East, comprising 14 higher education institutions and the Open University in the North West. The North West has a truly world-class offering in terms of both research and teaching provision for the nuclear sector. The aim of this submission is to illustrate the current role of the region's higher education institutions and the future role they will be able to play to underpin the growth of this sector, in particular response to the second bullet point 'the role of regional universities and education bodies in supporting the nuclear industry in the region'. The submission considers university strengths in relation to research, skills and collaboration with partners, including working with business.
2. Inevitably, a document of this nature cannot be fully comprehensive, given the sheer size and complexity of the higher education sector in the North West and that fact that many activities outside of the "core nuclear offer" have an existing and potential benefit for the nuclear industry. NWUA would be happy to amplify any aspects of this submission should this be required.

### Research

3. **University of Manchester** – Home to the Dalton Nuclear Institute with key expertise in: materials performance, radiochemistry, engineering and sustainability. The portfolio of nuclear research educational activity stands at around £100m involving 200 researchers. The University of Manchester, via the **Dalton Nuclear Institute**, is undertaking a joint £20m investment to establish a world class teaching and education facility in West Cumbria, linked with access to NNL's Central Laboratory. The facility will be equipped with state of the art equipment predominantly in the field of radiation sciences and the study of radiation damage of materials. The **Centre for Nuclear Energy Technology**, established with NWDA support, provides the University of Manchester with a reactor technology centre that will bring together a number of capabilities required to support academic and industrial interests in nuclear reactor systems. The

University of Manchester's **Materials Performance Centre** brings together world-class interdisciplinary centre for training and research in nuclear materials science and engineering

4. The **University of Liverpool** has an international reputation in the fields of Condensed Matter Physics, Nuclear Physics, Particle Physics and Accelerator Science. The University also has a radiometrics research group specialising in instrumentation and modelling.
5. The **University of Salford's Joule Physics Laboratory** carries out research into atomic collisions and ion-beam physics.
6. The **John Tyndall Institute for Nuclear Research, based at UCLan**, is focused on nuclear science, engineering and decommissioning, waste management, control and sensors analysis and monitoring, specifically relating to the nuclear environment. It is based at two sites – the Preston Campus and also the West Cumbria Campus located on the Westlakes Science and Technology Park. Research interests of relevance to the nuclear industry include; Waste Management and Control (e.g. surface contamination in form of radioactive metals or metal oxide deposits), Hazards and Safety Equipment for mechanical systems, Impact of radionuclide releases on ecosystems, Sustainable Development Research (through the Centre for Sustainable Development) Applied Policy Sciences, Epidemiology and Genetics (including cytogenetics, molecular genetics, statistical analysis of epidemiological data, internal dosimetry and data management).
7. **The University of Bolton's Centre for Materials Research and Innovation** has key strengths in the modelling, design and development of advanced materials of relevance to the Nuclear Industry as well as in methods for the detection of radiolytic products in foods and human body fluids.
8. **The Cockcroft Institute at Daresbury** incorporates academia, national laboratories, industry and the local economy in researching, designing and developing particle accelerators. The institute is a joint venture between the **Universities of Lancaster, Liverpool and Manchester**, the Science and Technology Facilities Council (STFC at the Daresbury and Rutherford Appleton Laboratories) and the North West Development Agency (NWDA). The Institute is located in a purpose-built building on the Daresbury Science and Innovation Campus adjacent to the Daresbury Laboratory and the Daresbury Innovation Centre, and has established satellite centres in each of the participating universities.
9. **Lancaster University** maintains a multidisciplinary team of engineering researchers working on the combination of instrumentation and generic control.
10. **The University of Manchester** is involved in a number of consortia in delivering national research programmes including:
  - 9.1 Membership of the **DIAMOND (Decommissioning, Immobilisation and Management of Nuclear waste for Disposal)** university research consortium focused on Nuclear Waste Management and Decommissioning.
  - 9.2 The **Dalton Nuclear Institute** leads the **Nuclear Engineering Doctorate Programme** providing nuclear Research Engineers with industry training.
  - 9.3 Membership of the **KNOO (Keeping the nuclear option open) consortium**, a four-year initiative set-up to address the challenges related to increasing the safety, reliability and sustainability of nuclear power and development of skills.

9.4 Leading the **SPRing (Sustainability Assessment of Nuclear Power: An Integrated Approach)** university consortium project developing a decision-support framework to assess the sustainability of nuclear power relative to other energy options.

### Skills

11. The higher education sector in the North West has a strong base in which to continue to provide relevant and appropriate skills provision for new graduates as well as those looking to up-skill or re-skill. Please see Appendix 1 for examples of relevant nuclear courses in the North West.
12. An important element of this provision is the number of short courses and continuing professional development courses that are expanding to offer employers appropriate provision in relevant topics e.g. CPD in Science and Technology of Nuclear Waste Management, CPD in Safety Case and Pg Cert in Radioactive Waste Monitoring and Decommissioning.
13. **Lancaster University** is home to the Lloyd's Register Educational Trust Chair in Nuclear Engineering and Decommissioning and runs highly-successful, industry-based Masters programmes in Nuclear Safety and Decommissioning.
14. **The Nuclear Technology Education Consortium (NTEC)** is a new concept in postgraduate-level training for the nuclear sector, developed by a strong consortium of UK universities and HE institutions, including the **University of Liverpool, Lancaster University, the University of Manchester** and the **Westlakes Research Institute**. The breadth and format of the training is designed to meet the UK's projected nuclear skills requirements in decommissioning and clean-up, reactor technology, fusion and nuclear medicine. Together the members represent more than 90% of the nuclear postgraduate teaching expertise residing in the UK's universities and research institutes. NTEC provides a one-stop shop for a range of postgraduate training in Nuclear Science & Technology which is unparalleled in the UK. The structure and content of the programme, which leads to qualifications up to Master's level in Nuclear Science & Technology, was established following extensive consultations with the UK nuclear sector, including industry, regulators, MoD, NDA, Government Departments and the Cogent Sector Skills Council.
15. The **University of Salford's Energy Centre** is looking to develop CPD to support the region's nuclear industry and will include nuclear safety modules.
16. **UCLan** offer a number of Foundation Degrees, many delivered in W. Cumbria which have been created for the nuclear industry (e.g. Nuclear Related Technologies, Nuclear Decommissioning).
17. **The Open University in the North West, the University of Liverpool and the University of Central Lancashire** are all University Associate Members of the National Skills Academy Nuclear (comprising three of only four HEIs engaged nationally).
18. Specifically for the nuclear sector, the Nuclear-graduate Programme is co-ordinated by **Lancaster University** and funded by the Nuclear Decommissioning Authority. It is backed by more than 20 leading companies including Rolls-Royce, UKAEA, and Sellafield.
19. The **University of Cumbria** has made advances in its infrastructure that would support the nuclear economy by the establishment of a School of Sustainable Engineering. In addition, The University of Cumbria is exploring the development of modules for the Civil Nuclear Constabulary and the use of University facilities to deliver some of their Basic Training (in conjunction with Cumbria Constabulary).

## Collaboration with partners and working with business

20. The **University of Cumbria** is keenly aware of the opportunities that flow from the nuclear industry in terms of skills and training requirements and is already working in partnership with the Nuclear Decommissioning Authority which has invested in the development of an Energy Coast Campus in west Cumbria (near Workington). This facility, which is a shared teaching and learning space among a number of partners, was originally developed with the aim of supporting west Cumbria in diversifying from a nuclear sector, which at that point was in decline, into other areas of low carbon energy solutions. The renaissance of the nuclear option as an acceptable low carbon option is clearly changing that proposition and the campus is ideally located and equipped to contribute to delivery of programmes that would support this economy. The University is planning to incrementally build up the number of students at the Energy Coast Campus site over the next 5 years. It is anticipated that the majority of this provision will be made up of part time, work based learning and third stream funded students. The University expects to be working not only in partnership with the NDA but also Lakes College; **Lancaster University**; **UCLan** and **Manchester University** in the delivery of future projects.
21. **The Dalton Nuclear Institute at the University of Manchester** is able to offer companies depth and breadth of consultancy expertise from technology assessments to reviews of socio-economic impacts in the key areas of materials performance, radiochemistry, radiation sciences, fusion, modelling and simulation and nuclear physics.
22. **UCLan's** 2005 acquisition of the **Westlakes Research Institute (WRI)** has given the John Tyndall Nuclear Research Institute access to the WRI internationally respected expertise base with specialisms in environmental measurement and monitoring, environmental legislation and radiological and environmental assessments. This operation has over 60 staff involved in research and consultancy and all have significant experience of working in the nuclear industry. Colleagues regularly advise national and international bodies including the International Atomic Energy Authority. UCLan supported by Westlake Renaissance and the west Cumbria Development Fund has invested £5 million on the comprehensive redevelopment and extension of the Westlakes Campus. Facilities include a new wet laboratory and advanced teaching areas with the latest high performance computing facilities, making this a recognised centre of excellence for nuclear activity on Britain's Energy Coast™. The new Samuel Lindow Building forms the heart of the UCLan Westlakes Campus. The building has been developed from the original Westlakes Research Institute building, upgraded to provide enhanced facilities for students, state of the art technology and environmental performance in line with UCLan's other facilities. Opened in September 2009, the facility is already delivering a wide range of courses for the nuclear industry along with events and business incubation activities. Westlakes Scientific Consultancy provides environmental consulting and health research services. The UCLan Centre for Sustainable Development also is able to provide support to the nuclear industry on a wide range of sustainability issues.
23. **UCLan** is leading the **Nuclear University Enterprise Network (UEN)** together with the Northwest Regional Development Agency (NWDA), supported by Westinghouse UK, part of the Westinghouse/Toshiba global organisation specialising in fuel manufacture and reactor design. The UEN will support entrepreneurship across the university, involving academic staff, students and industrial partners, with activities focussed around the nuclear theme and associated Science, Technology, Engineering and Mathematics subject areas.
24. The **Nuclear-graduate Programme** (see paragraph 18) co-ordinated by **Lancaster University** has been funded by the Nuclear Decommissioning Authority to help run the most comprehensive graduate programme the nuclear industry has ever seen. The programme has been established to

run over a 47 month period and is backed by more than 20 leading companies, from Rolls-Royce to BAE Systems and Toshiba, and aims to plug a nationwide skills gap in decommissioning. The industry faces shortage of not only qualified engineers but also graduates in finance, communications and marketing, HR and environmental science. Twelve graduates from a variety of backgrounds have already been recruited for the first programme cohort of three, with placements organised through Lancaster University's Centre for Employability Enterprise and Careers (CEEC).

## **Conclusion**

25. The universities in the North West have a strong history of providing supporting to the nuclear industry both in terms of academic taught courses and the growing breadth of research in this field. Partnerships with external organisations and employers are producing higher education courses in the nuclear sector more tailored to the needs of the industry and the study requirements of its employees. This submission shows that the University sector in the North West is well positioned to support the nuclear industry in the region. The North West Universities would welcome any incentives or assistance that could be provided in this endeavour.