Note of SAFESPUR Meeting

Nuclear Skills and Knowledge Transfer – Challenges and Solutions
Inmarsat Conference Centre, London, 4 December 2008

The meeting was held to discuss recent initiatives to improve the UK nuclear skills base and to identify what needs to be done to meet future requirements. There was also discussion of knowledge management, for example in the context of how accumulated experience can be passed on to new employees. The meeting was chaired by Peter Booth of the National Nuclear Laboratory. He noted in his introduction that the nuclear industry had lost skills in recent years and would continue to do so as people retired. It was timely to ask what was being done to replace lost skills and preserve knowledge, and what should be done in future. The output from the meeting might be used in designing a breakout session at the 2009 SAFEGROUNDS and SD:SPUR conference.

Nuclear Decommissioning Authority Skills and Capability Strategy
The first presentation was given by Nigel Couzens, Head of Skills and Capability at the Nuclear Decommissioning Authority (NDA). He drew the attention of participants to three publications on the NDA Skills and Capability Strategy that are available on the NDA website[1] and showed a DVD about the strategy and its implementation. The strategy covers all four levels in the "skills pyramid": the science, engineering, technical and mathematics curriculum in schools; vocational training; first degrees; and Masters degrees and PhDs. The National Skills Academy Nuclear is a key deliverer of the strategy.

In schools, the NDA supports the Energy Foresight programme, with the aim of increasing pupils' understanding of nuclear power and other applications of nuclear technology. A DVD package for 14-16 year olds has been used in 130 schools to support the national curriculum and is being introduced in about a further 400 schools in a second phase of the programme. Vocational training initiatives include NVQs in nuclear technology and decommissioning, and sponsorship of apprenticeships. There are also short "foundation degrees" that offer a mixture of on-the-job training and off-site academic learning for new recruits and existing employees. At various universities the NDA sponsors full first degrees, Masters degrees and PhDs in areas relevant to its remit. The graduate recruitment scheme (see www.nucleargraduates.com) is proving very successful. It covers a wide range of disciplines and involves some 26 companies, with which graduates are placed on a rotational basis to gain experience.

The NDA works with its Site Licence Companies (SLCs) and with the supply chain to understand what skills will be needed. The SLCs now use their Lifetime Plans (LTPs) to identify resource requirements, including major skills gaps and when they will occur. The sites' skills strategies are being made available outside the NDA, to skills providers and others. In the NDA's view, the main need is not for the UK nuclear industry to invest more money in skills but to use its money more effectively. It is important to bring employers together, and to do so in more innovative ways.

National Skills Academy for Nuclear
Jo Tipa, Operations Director at the National Skills Academy for Nuclear (NSAN) gave a presentation about the NSAN's achievements to date and its future plans. The NSAN became operational in January 2008 and is a wholly owned subsidiary of Cogent Sector Skills Council. It is an enabling organisation, not a direct provider of training. For the first three years of operation the NSAN is half funded by employers and half funded by the Learning and Skills Council via the Department of Innovation Universities and Skills (DIUS).

[1] The Skills and Capability Strategy, the Skills and Capability Action Plan and the Skills and Capability Case Studies, all dated November 2008.

After the first three years the NSAN must be self-sustaining. The NSAN is employer led and its board of directors is made up of employers representing 18 organisations, including a number of companies from outside the UK.

NSAN is set up on the basis of five regions: Northwest and Northeast England, Southeast and East England, Southwest England, Scotland and Wales. Each region has an NSAN regional manager, an employer steering group and a network of quality-assured providers of training. The regions have business plans that cover their own needs and contribute to the delivery of the NSAN's national plan. In its first year NSAN has worked with the Energy Foresight programme in schools, helped set up 37 new apprenticeships, endorsed four foundation degree courses via its university partners the University of Central Lancashire (UCLan) and Portsmouth University, and awarded 49 bursaries.

NSAN has also started a major project to set up the Nuclear Skills Passport scheme. The passport is, in effect, an entry in a database that records the standard of skills reached by an employee. The scheme will cover all aspects of the nuclear industry: power generation, decommissioning and defence. It will make it easier for employees to move between sites, and hence make it easier for employers to respond to peaks and troughs in demand. It is underpinned by the National Nuclear Industry Training Framework. The passport scheme involves employers signing up to skills standards, for example agreeing that completing a particular training course (national, regional or at a particular nuclear site) qualifies employees to do a particular type of work on any nuclear site. The passport has been piloted and will be further developed in 2009. There will be a charge for the passports.

Other NSAN plans for 2009 include attracting about 50 new employer associate members, quality assuring about 12 more training providers, and expanding NSAN's understanding of how to work with international standards (for example those promulgated by the World Association of Nuclear Operators (WANO)). There is also interest from other countries in the Nuclear Skills Passport scheme.

National Nuclear Laboratory

The third presentation was by Fiona Rayment, Head of Technology at the National Nuclear Laboratory (NNL). The NNL was formed in 2008 from Nexia Solutions, which had its origins in the Research and Technology Division of BNFL. It has over 600 employees in six locations in the UK. The management contract for the NNL is currently out to tender. Once the management contract is in place, the NNL will be funded entirely through the fees it earns by carrying out work for its customers.

One of the NNL's functions is to maintain UK nuclear R&D skills. As Nexia Solutions it carried out a skills review. This identified 72 areas in which R&D skills needed to be maintained in the UK. It also examined the minimum practitioner levels required in each area, and the need for leaders and successors. The NNL now maintains an R&D skills risk register, which is updated quarterly. As well as risks, the register lists the actions to be taken to mitigate those risks, for example the need to begin recruitment before a skills gap appears.

The NNL has observed that, since the formation of the NDA, UK skills in the management of radioactive wastes and radioactively contaminated land have become spread over a larger number of organisations. This may lead to some problems in maintaining the appropriate technical standards. For example, some companies may underestimate the degree of specific nuclear knowledge required to work on licensed sites, and some may have difficulties in keeping up to date with regulations and with site specific requirements. NNL sees a need to manage talent more effectively, including succession planning. It believes that innovation will become even more important in the future and that step changes will be needed, not gradual improvements. The NNL is carrying out a number of activities to assist

in these areas: it is partnering and collaborating with other organisations, maintaining strong university links and links with other national laboratories, seconding people to organisations such as regulators, managing its own talent and mentoring younger employees.

Cross-Over of Skills from the Non-Nuclear Sector
The fourth presentation was by Diane Robson, Director of Green Earth Management Company Ltd (GemCo), which she founded in 2006 to be a bridge between contaminated land consultants and contractors. Her presentation was about the possibility of using skills from the non-nuclear sector to fills gaps in the nuclear sector while other initiatives come to fruition.

Relevant cross-over skills exist in the construction industry, the oil industry, deep mining and tunnelling companies, academia and media and communications companies. The people concerned are mainly qualified to degree level and all have technical knowledge and experience that new graduates lack. They can also bring in knowledge and techniques that are new to the nuclear industry, although they have been used elsewhere. For example, the NDA's future work to characterise and assess potential sites for a geological disposal facility would benefit from expertise and experience gained in other industries. Similarly, SLCs' future work to deal with their contaminated land could be helped by bringing in more consultants and contractors who work mainly on non-nuclear, non-radioactively contaminated sites.

People from the non-nuclear sector will need to top-up their skills in topics specific to the nuclear industry, in particular its regulatory framework and extensive use of safety cases. This could be achieved by providing suitable training courses, including Masters course at universities. It would also be valuable for people from the non-nuclear sector to have mentors in the nuclear sector. It will be important for non-nuclear companies to learn how to become part of the nuclear supply chain, as well as for their staff to receive appropriate training.

Managing Knowledge
To assist the subsequent group discussion, David Churcher of Hitherwood Consulting gave a brief presentation about knowledge management. He distinguished between data (facts and figures), information (obtained by processing and analysing data), knowledge (obtained by interpreting information in various contexts) and wisdom (obtained from reflection and experience). He explained that organisational knowledge can be divided into four types, according to whether it is explicit or implicit (tacit), and whether it is individual or collective. Issues for managers include whether tacit knowledge can be transformed into explicit knowledge, and if not whether tacit knowledge be passed on effectively. There are also the questions of what organisational memory is and how it can be managed, and, more fundamentally, to what extent is knowledge really manageable? He ended by identifying some issues for SAFESPUR and its members about the role of the supply chain in knowledge management in the nuclear sector.

Group Discussion
The meeting split into three groups, each of which was asked to consider a theme that had arisen from the presentations, and issues within that theme. The following is a record of the main points made under each theme.

Managing knowledge in a fragmented supply chain
Suggested issues for discussion:

1. What is the split between knowledge in the SLCs and in the supply chain?
2. Balancing depth and breadth of knowledge in a single organisation or supply chain
3. PBOs/SLCs raising awareness of their needs amongst non-nuclear suppliers
4. Bringing knowledge back in to the sector.

Points made by group:

- Nuclear site licensees need sufficient knowledge to:
    - manage the site
    - manage the suppliers
    - liaise with regulators.
- Intellectual property considerations create tension in suppliers between demonstrating innovation and losing competitive advantage.
- New people joining the industry must have the ability to acquire knowledge as well as technical skills and qualifications. Mentoring and on-the-job training are important.
- Cross over of skills from the non-nuclear into the nuclear sector is happening. For example, partnering between different types of firm is occurring.
- International nuclear skills are coming into the UK – particularly associated with new build – it is likely that non-nuclear will follow.
- Contractorisation of MoD sites, with consequent loss of crown immunity, has been a catalyst for work to start on these sites.

Connectivity between the extended supply chain and the strategy-setting and enabling organisations

Suggested issues for discussion:

1. How can tier 3 or 4 suppliers engage?
2. What are the barriers/practicalities to be overcome?
3. How does the non-nuclear sector get (more) involved?

Points made by group:

- Connectivity can be improved through networking at conferences. Nuclear site licensees, the non-nuclear sector, suppliers and regulators all need to be involved. This could start immediately but should be linked with key themes/issues.
- Engagement could occur through key-theme conferences. Cross-tier integration is important (ie vertically, ideally from Government to tier 4). Mixing nuclear and non-nuclear participants would help them to learn from each other.
- Barriers to connectivity/networking include:
    - the nature of the industry itself (insular, perceptions from outside)
    - intellectual property considerations
    - staff may be poached by rivals.
- Non-nuclear involvement could be encouraged through mixed forums, cross-over case-studies, and more opportunities to partner.
- A "Who's Who in the Nuclear Sector" could be developed, to help engagement within the sector and involvement of the non-nuclear sector. It could be charged for (eg by subscription). The level of information available about each company and person would need careful thought to avoid concerns about competition/poaching.
- Regulators were not present at this meeting. They have skills needs that must be filled.

The practicalities of developing the required skills

Suggested issues for discussion:

1. The potential problem of timing between industry needs and skills programme delivery
2. Impact of global competition for skilled people
3. Routes to top-up skills for non-nuclear supply chain.

Points made by group:

- The timing issue:
    - the nuclear industry needs short-term cross-overs and skills top-ups to fill the gaps before apprenticeships and degree courses deliver, and while newly qualified people gain experience

- it is necessary to analyse the duration of work programmes to find out which skills need which approach
- there is a need to keep skills within the UK, but it is not clear how to do this.

- How to top-up:
  - networking to raise awareness
  - publish SLCs' lifetime plans in full so everyone can see the skills needs
  - extend above to PBOs as well
  - encourage secondments (both ways).

- Training mechanisms:
  - on-the-job training is best for "nuclearising" incoming staff (technical and business administration)
  - use a full range of approaches to complement existing more-formal routes
  - recruit good general scientists/engineers and add specialist nuclear training later (in addition to recruiting graduates with specialised nuclear degrees).

- SAFESPUR could: help identify skills requirements from site plans; match with supply base (by asking them!); encourage mixing between nuclear and non-nuclear supply chains. It will be important to use a regional approach to identify local skills.

Conclusions

Peter Booth concluded the meeting by making the following points.

- There are skills gaps in nuclear decommissioning, waste management and new build.
- There are several good initiatives in progress to fill these gaps, for example at the NDA, NSAN and NNL.
- The success of these initiatives in future depends on the availability of funding, particularly from the nuclear industry.
- There is a need for experienced people from the non-nuclear sector to fill current and near-future skills gaps in the nuclear sector.
- Networking will be a key activity in promoting awareness within the supply chain and encouraging the entry of non-nuclear companies.
- A number of suggestions had been made for improving the UK's nuclear skills base and its management of nuclear knowledge. SAFESPUR could help with some of these and further thought will be given to this.
- More cross-fertilisation between SAFEGROUNDS, SD:SPUR and SAFESPUR would be valuable.