

Upskilling and Reskilling for the Nuclear Industry – 17276

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ABSTRACT

In the UK, nuclear skills and qualifications have been the subject of several studies in higher levels of Government, including one by UK Cabinet Office. The newly formed UK Nuclear Skills Strategy Group (NSSG) has been tasked with addressing the current skills and people gaps for the UK nuclear industry. The NSSG is working with several key organisations in the UK: The National Skills Academy for Nuclear, (NSAN), which covers skills interventions, training and workforce development and experience, and the newly forming National College for Nuclear (NCfN) which will become a nuclear qualifications awarding body, regulating educational qualifications and curriculum in the nuclear sector. The NSSG has published its own UK Nuclear Skills Strategy in December 2016, aligned to the UK Cabinet Office study. It is the intent that, in the near future, nuclear qualifications and experience will be directly transferable across different organisations and nuclear sites in the UK, enabling the maintenance of high standards of behaviours and improved mobility throughout the sector.

The UK needs to maintain and grow a diverse workforce and nuclear Suitably Qualified and Experienced Personnel (SQEP) people. The 2015 UK Nuclear Labour Market Intelligence (LMI) report, produced by Cogent for the Nuclear Energy Skills Alliance (NESA), concluded that the total nuclear workforce demand for the UK Nuclear Civil and Defence sector needed to grow by 33,000 people in the next five years, which includes replacement and expansion demand. This involved all disciplines and grades, with for example, higher level skilled workers needing to increase by 2200 FTEs every year. The main discipline pinch points were in, for example, Mechanical; Electrical; Project Management; Safety Case Specialists; Commissioning Engineers. Of the overall workforce, around 10% is over 60 years old and around 38% is over 50 years old.

Jacobs in the UK is widely involved in many aspects of skills and competence development, with active involvement in local and national training programmes, and driving new methodologies to accelerate our staff's journey to nuclear competence. As well as looking at the immediate future, there is a risk in the UK that, over the 120-year plus clean-up mission, there won't be enough people with the right skills. Jacobs is developing sustainable solutions to this in our skills and development strategy for the nuclear sector.

Jacobs has developed a variety of approaches to help us maintain and grow our diverse workforce and nuclear "SQEP" people. This includes:

- Identifying and developing our employees' technical and personal skills and capabilities, particularly the requirements of our millennials in both technical and social aspects of their working lives.

- Identifying and planning for our future skills needs to meet our projected business requirements.
- Our programme to transfer skilled employees from other sectors into the nuclear industry.
- Our extensive school student placement scheme, aligned to the UK's "Industrial Cadet" scheme, which has helped to bring school-aged students into Jacobs on workplace experience.
- Our collaboration with our customers to develop UK national level Trailblazer Apprentice programmes.
- Our involvement at a UK national level in the work of the National Skills Academy for Nuclear (NSAN), the Nuclear Energy Skills Alliance (NESA) High Level Skills Committee and the newly forming UK National College for Nuclear (NCfN).
- Our work to ensure diversity is valued in our workplace, for example in our involvement in "Women in Nuclear".

INTRODUCTION

The UK nuclear industry is about to embark on unprecedented growth over the next ten years which will result in many infrastructure challenges at local, regional and national levels, with high demand for nuclear competent people and increased competition for niche skills.

In order to address the required growth over the next ten years, a new Nuclear Skills Delivery Model has been developed by the UK Nuclear Skills Strategy Group (NSSG), which has built upon the excellent previous and existing work of several bodies. It is likely that this model will change over the coming months to adapt to meet delivery requirements. The model was developed by the industry, rather than in response to a Government request.

The principle aim of the NSSG is to provide a single voice to Government from the UK Nuclear Industry, in key areas such as workforce management and ensuring the industry has the skills required for a safe and sustainable future.

The nuclear market in the UK is growing, for example with new build nuclear reactors scheduled to come on line over the next decade and the accelerated decommissioning of legacy facilities. This means there will be a large increase in demand for nuclear skilled trade and professional people over the next few years, which will require an industry-wide approach to ensure future programs are met to cost and schedule.

The bow-wave of resource demand has been predicted, in the latest Labour Market Intelligence report [1], to peak around 2021/22, based principally on the new nuclear build schedule from late 2015. This peak is predicted to reach 111,280 in 2021, from the 77,880 2015 baseline.

Occupations noted with potential demand / supply pinch points are:

- Mechanical Engineering
- Electrical Engineering
- Construction and Decommissioning Trades
- Control and Instrumentation
- Project and Programme Management
- Steel Fixers
- Concretors
- Civil Engineering Operatives
- Scaffolders.

Employment levels also change regionally and by industry sector. Additionally the UK nuclear industry requires a range of skill levels and accumulated experience. Work has been done to assess the impact of expected demand on the High Level STEM skill demand, in particular when the requirement for Subject Matter Experts requires a lot of “incubation” time.

THE UK NUCLEAR SKILLS DELIVERY MODEL

2016 saw the emergence and growth of the UK’s Nuclear Skills Strategy Group (NSSG), which is a partnership of employers, government and trade unions. It comprises:

- Major employers who have the plans and the expenditure to drive the major developments in the UK nuclear sector
- Government departments responsible for nuclear development and skills leadership
- A representative of the trade unions in the nuclear sector.

The NSSG is the UK’s lead strategic skills forum for the nuclear industry, representing both the civil and defence nuclear sectors. In order to address the challenges ahead (see sections “Introduction” and UK Labour Market Intelligence Report 2015”), the NSSG has developed a new Nuclear Skills Delivery Model [2]. This is represented in Figure 1 below:

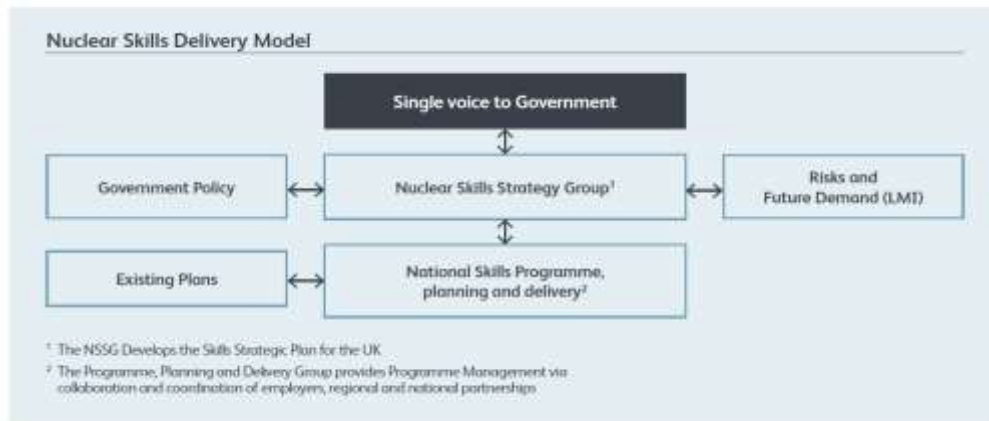


Figure 1: UK Nuclear Skills Delivery Model

One of the primary tasks for the NSSG was to develop and deliver a UK Nuclear "Strategic Plan", which was launched in December 2016. The Strategic Plan presents the key actions designed to close skills gaps and ensure the sector is gearing up to secure a world class talent base and establish training provision that allows for continual replenishment of such skills and expertise. Its aim is to make a real difference and deliver the nuclear sector's continued success through its people.

By analysis of the risks and evidence developed, three strategic themes and two enabling themes emerged:

Key strategic themes

- Meeting the demand
- Training infrastructure and provision
- Training Standards and Qualifications

Enabling themes:

- A clearly defined and NSSG endorsed skills delivery model
- An agreed nuclear timeline and clarity of demand requirements

As a consequence, nineteen strategic actions have been developed, which will subsequently be turned into a detailed action plan to allow full programme management to be applied.

Realisation of the Strategic Plan should deliver a number of benefits for the UK Nuclear Industry, namely;

- Positioned to deliver the required increase in workload without over-reliance on foreign labour.

- Local needs in the foreseeable future met by a nuclear competent workforce.
- Enhanced long-term career opportunities for STEM apprentices and graduates.
- A flexible and more mobile workforce
- A powerful UK skills base capable of responding to international opportunities.
- Reduction in costs to utilities and the tax payer (for Government funded national programmes).

UK LABOUR MARKET INTELLIGENCE REPORT 2015

Around April each year, the UK, through the Nuclear Energy Skills Alliance (NESA), published a nuclear Labour Market Intelligence report [1], which represents the best currently available workforce data for the UK nuclear industry for the previous year, comprising both Civil and Defence, and predicted Nuclear New Build.

The nuclear workforce model provides a good indication of the national skills challenge, for the industry to inform strategic skills for a, including the NSSG. Even though the Nuclear New build had rapidly advanced in terms of capital investment and the establishment and growth of project teams, the report had to make generic assessments about new reactor workforce models. The start dates for each of the UK new nuclear power stations have all gone out since the data in the report was taken, so the resource peak profile should be changed in shape (but not as much in volume). This more recent change should be addressed, at least in part, in the 2016 assessment to be published in April 2017.

The key findings of the report, based on the 2015 data, are given as follows:

- The peak in the overall workforce demand (including construction) occurs in 2021, based on a generic (rather than detailed) new build schedule.
- The total workforce demand is expected to grow from 77,880 in 2015 to 111,280 in 2021. A number of changes have contributed to this net increase, including improvements to the supply chain calculation and the Engineering Construction count, some additional level 1 staff not previously counted, and other contributions covering R&D and regulation.
- Over the six years between 2016 and 2021 new data predicts that the demand for the existing estate will actually increase by 4.2% followed by a decrease of 26% to 2030. The Civil New Build workforce, estimated to be around 4.5% of the total in 2015, will rise to form 30% of the total in 2021.
- From 2015 to 2021 the forecast average required annual inflow, including replacement and expansion demand, is 9,000 Full Time Equivalents (FTEs) per annum (not all necessarily long term appointments). As expected, particularly high rates are predicted for Engineering and Trade.

- Workers with High Level STEM Skills (those 'having chartered status, or having the potential to be chartered, in science and engineering disciplines) are forecast to be required at a rate of 2,200 FTEs per year
- At peak demand on the Civils Construction, over 4,000 workers will be required on each nuclear new build site
- For some occupations in the South West and East of England peak Civils Construction demand could be as much as 20% of available Civils Construction resource; and in Wales over 50%
- The manufacturing workforce is expected to rise from around 4,000 in 2014 to 8,500 at the peak of onsite activity in 2025

Occupations noted with potential demand / supply pinch points are:

- Mechanical Engineering
- Electrical Engineering
- Construction and Decommissioning Trades
- Control and Instrumentation
- Project and Programme Management
- Steel Fixers
- Concretors
- Civil Engineering Operatives
- Scaffolders.

The report breaks down the data in many different ways, such as by:

- UK geographical region,
- Resource type,
- Operational mode,
- Age Profile,
- Skill level
- Training level

NATIONAL COLLEGE FOR NUCLEAR

The National College for Nuclear (NCfN) is one of five National Colleges in England that will create the workforce of tomorrow by delivering high-level technical training to thousands of learners across England [3]. Set across two hubs (one in Somerset and one in Cumbria) the College will develop, and deliver, the UK's nuclear

curriculum, designing new qualifications and training courses that are attractive to learners and meet the demand for highly skilled workers in the nuclear sector.

As well as an Executive Board, the NCfN is supported by an industry-supplied committee that develops the future requirements for academic curriculum and qualifications, as required by the industry, with an aim to transferable across all parts of the UK nuclear and defence sectors.

NUCLEAR ENERGY SKILLS ALLIANCE – HIGH LEVEL SKILLS

A small group of UK Companies and Academic Institutions form the Nuclear Energy Skills Alliance (NESA) High Level Skills Group. This group is developing a summary of the UK's future nuclear programme and the associated timelines with the aim of ensuring that the UK has the necessary expertise to deliver its proposed programmes throughout their duration. A Skills Gap Consultation paper was published in November 2016 [4].

The NESA Group is particularly concerned to ensure that the UK has access to Senior Technical Specialists (sometimes also referred to as Subject Mater Experts), and recognises that developing Senior Technical Specialist status takes a long time. The Group does not see Senior Technical Specialists as a separate group, but rather the end of a career path which leads to greater technical specialisation.

Generally, only a small number of Senior Technical Specialists is required in any given topic area, and this, together with the high degree of specialisation, means that it is not possible to determine Senior Technical Specialist requirements at the UK level reliably from 'big picture' exercises, such as the nuclear Workforce Model detailed above and in reference [1].

The absolute minimum capability required is that the UK has the ability to act as an intelligent customer for technology although, if the UK chooses to develop an indigenous technology, that decision will lead to greater demand for high level technical skills.

The Consultation paper proposes 6 key recommendations:

- Government should ensure that the UK has the ability to deliver its chosen option(s) for the management of plutonium. The requirements differ depending not just on the technology choice, but also on a 'make or buy' decision. Until these decisions are made and implemented, Government should ensure that the UK skills base is sufficient to keep all options open.
- Government should ensure that the UK has the ability to deliver its chosen option(s) for the management of uranium. Specific areas of focus include the safe and secure storage of uranium over many decades, the management of highly enriched uranium and the development of disposal routes for uranium declared to be waste.

- Scottish Government should ensure that the Nuclear Decommissioning Authority (NDA), through Radioactive Waste Management (RWM) Ltd, the implementer of radioactive waste disposal, can develop 'fit for Scottish purpose' safety cases and implement solutions which are consistent with Scottish Government policy, and that the statutory regulators have the capacity to assess such activities.
- Government should ensure that the UK has the ability to deliver its technology choices. In the case of Sodium Cooled Fast Reactors (SFR), this is primarily knowledge capture and knowledge management. It should ensure knowledge from the Advanced Gas-Cooled Reactors (AGRs) is preserved and that propulsion technology can be translated to Small Modular Reactors (SMRs). A skill base in recycle needs to be retained.
- UK and Scottish Governments need to identify a body to take responsibility for development of Senior Technical Specialists in the areas identified, empower it to address these weaknesses, and provide the necessary resources.
- In these areas of specific weakness, the NDA mission should be broadened so that it can play a full part in the UK's nuclear future.

JACOBS SKILLS AND COMPETENCY DEVELOPMENT PROGRAMME

Jacobs has a strong and close involvement in the development and implementation of the UK's nuclear skills and competency development to meet the future demands of the UK nuclear industry.

As well as a strong internal training programme, focused on training, skills and competency development and meeting customer workforce requirements, Jacobs is inputting into the following at a UK national level:

- National Skills Academy for Nuclear (NSAN) Advisory Board Member
- National College for Nuclear – Chair of the Curriculum and Qualifications Committee
- Nuclear Energy Skills Alliance – High Level Skills Committee Member.
- Member of the Working Group to develop the new "Nuclear Degree Apprenticeship"
- Member of the UK Nuclear "Standards Advisory Group"
- Member of the "Nuclear Graduates Customer Steering Group"

CONCLUSION

The organization of UK nuclear skills and competence has evolved to meet predicted

unprecedented growth over the next ten years. This growth is expected to result in many infrastructure challenges at local, regional and national levels, and skills gaps have been identified.

A new organization, the Nuclear Skills Strategy Group has been set up by Government and the Nuclear Industry to address these skills gaps, and provide guidance on tactical delivery over the next decade.

Jacobs has a strong and close involvement in the development and implementation of this forward looking skills and competency development programme, and is looking forward to the positive challenges of the next decade to ensure the UK delivers its nuclear goals.

REFERENCES

1. S. Bennett et al., Nuclear Energy Skills Alliance, Nuclear Workforce Assessment 2015, pp. 25–30, J. SMITH, Ed
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