Renaissance Britannia
Tackling the People
Challenge
ENEN Workshop
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Cogent SSC

Nuclear is part of the answer

• Government Challenges:
  • Security of energy supply.
  • Tackling climate change.
• Current capacity 15-17% baseload
• Replacement stated 16Gwe on 8 sites
• Higher baseload possible - 40% Nuclear?
• Industry Challenge:
  • Articulate the skills are required to support the new build programme.
  • Appreciate the scale of skills required and volume of training.
  • Develop and maintain a pervasive safety culture.
What is a nuclear worker?

Challenge - Capturing Nuclear Industry Skills Needs

- Lack of national data – limited SIC/SOC coverage
- Lack of common role descriptors
- A description of the roles in the nuclear industry required to achieve granularity of LMI.
- On formation of NDA ~900 role description now at 51. Another company has 22 skillsets, another 54 resource codes, another 9 competence frameworks ............
- Need a common language for resource accounting and skills needs capture – Job Contexts
### Job Contexts

1. Energy Production Operations
2. Decommissioning Operations
3. Process Operations
4. Maintenance Operations
5. Safety & Security
6. Radiation Protection
7. Project Management
8. Engineering Design
9. Scientific & Technical Support
10. Business
11. Construction
12. Waste & Repository Operations
13. Commissioning Operations
14. Manufacturing

### Challenges

**Current workforce profile**

**Civil Nuclear Industry - Job Context Population 2009**

**Total:** 43,690

- **Commissioning:** 270
- **Waste & Repository:** 1330
- **Construction:** 218
- **Business:** 4189
- **Scientific & Technical:** 925
- **Engineering Design:** 1990
- **Project Management:** 1946
- **Radiation Protection:** 864
- **Safety & Security:** 2058
- **Maintenance:** 4117
- **Process:** 1672
- **Decommissioning:** 1912
- **Energy Production:** 2497

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**Role Levels**

- 5. Senior Managers
- 4. Middle Managers/Graduates
- 3. Technician
- 2. Skilled
- 1. Semi-skilled
Accumulated Retirement Profile of Civil Nuclear Workforce

<table>
<thead>
<tr>
<th>Year</th>
<th>% of Workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-2010</td>
<td>9.9%</td>
</tr>
<tr>
<td>2010-2015</td>
<td>19.4%</td>
</tr>
<tr>
<td>2015-2020</td>
<td>36.6%</td>
</tr>
<tr>
<td>2020-2025</td>
<td>53.7%</td>
</tr>
</tbody>
</table>

Comparison of Total Retirement - Skill Level by 2025

UK Workforce

Civil Nuclear Workforce

<table>
<thead>
<tr>
<th>Skill Level</th>
<th>UK Workforce</th>
<th>Civil Nuclear Workforce</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semi-Skilled</td>
<td>46.8%</td>
<td>53.6%</td>
</tr>
<tr>
<td>Skilled</td>
<td>44.3%</td>
<td>44.4%</td>
</tr>
<tr>
<td>Technician</td>
<td>38.1%</td>
<td>52.8%</td>
</tr>
<tr>
<td>Professional</td>
<td>45.0%</td>
<td>56.9%</td>
</tr>
<tr>
<td>Managers and Senior Management</td>
<td>46.1%</td>
<td>67.4%</td>
</tr>
</tbody>
</table>
Renaissance 1:
Power People: The Civil Nuclear Workforce

Renaissance 2:
Next Generation: Skills for New Build Nuclear

Renaissance 3:
Assurance: Skills for Nuclear Defence

Renaissance 4:
Illuminations: Future Skills for Nuclear

Workforce Model for a Single-Unit Station

- Electrical and Mechanical
- Construction
- Operation (HQ Support)
- Operation (Supply Chain)
- Operation
- Site Prep & Technical Support
Aggregated Workforce
(Reactors at mixed 12/18 month intervals)

Decommissioning/New Build
Operator Skills Valley
Global Competition – Some Facts

- Over 430 nuclear reactors in commercial operations
- 50 new reactors are being built
- 130 reactors are planned
- 250 reactors are proposed
- 220 reactors on board ships and submarines
- 30 countries operate nuclear reactors commercially
- 56 countries operate 284 research reactors

Source: WNA et al

Need for Demonstration of Competence

- Lessons Learned from previous Nuclear Incidents:
  - 1979 TMI -> INPO
  - 1986 Chernobyl -> WANO
  - 2011 Fukushima ...............
- Previous Build experiences - Royal Academy of Engineering - *Nuclear Lessons Learned* - Engineering the Future report on planning for a nuclear new build programme
  - Notes importance of nuclear safety behaviours and attitudes in nuclear construction.
  - Importance of technical discipline competence.

**Demonstrating Competence**

• Job Contexts provide a vehicle for specifying overall competence requirements.
• Similar taxonomy projects being developed by OECD/NEA

<table>
<thead>
<tr>
<th>Skill Area</th>
<th>Knowledge and behaviours</th>
<th>qualifications and training standards</th>
</tr>
</thead>
</table>
| **Technical Competence**      | - Prepare work for decommissioning  
- Assemble and dismantle decommissioning equipment  
- Operate, maintain, monitor and adjust equipment  
- Dismantle contaminated plant etc.  
- Decontaminate radioactive plant site  
- Remove and transfer hazardous materials  
- Operate in pressurised suite environment | PIAA/VOSET Level 2 Diploma in Nuclear Decommissioning (NVQ) (QCF)                                      |
| **Business Improvement**       | Solve routine decommissioning problems with efficiency techniques  
Apply workplace organisation techniques  
Understand variety of efficiency improvement techniques | Optional Level 2 Diploma in Business Improvement                                                  |
| **Compliance**                | - Safety, security expectations on nuclear sites  
- Principles and implications of radiation hazards  
- Procedures for radioactive discharge, waste, transfer control, etc.  
- Safety management systems e.g. Permit to Work, SOP's and Risk Assessments  
- Company policy, legislation and regulation | Basic Common Induction Standard  
Basic NI Behaviours Training  
Basic NI Context Training Standard  
* Working Safely Training Standard                                               |
| **Functional and Behavioural**|                                                                                                           | Can be acquired through GCSE and Core/Functional Skills programmes                                |
|                               | Communications  
Numeracy  
ICT  
Team working and Personal Development  
Take responsibility for completing tasks and procedures  
Coach others | Optional Level 2 ILM Award in Personal Development                                                |
Demonstrating Competence

• Job Contexts provide a vehicle for specifying overall competence and qualification/training requirements.

Industry Training Framework supports:
Skills Academy Nuclear Skills Passport [http://www.nuclear.nsacademy.co.uk/nuclear-skills-passport](http://www.nuclear.nsacademy.co.uk/nuclear-skills-passport)
THE SKILLS PYRAMID

The Nuclear Skills Passport recording nationally recognised skills and training across and underpinning the skills pyramid

Targeting Training

- Safety Training
- Safety Culture all pervasive
- INSAG 15 defines safety culture as “that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance.”
- Need for robust Human Performance training
- Security Training – Nuclear Material Accounting and Safeguards National Occupational Standards
THE SKILLS PYRAMID

The Nuclear Skills Passport recording nationally recognised skills and training across and underpinning the skills pyramid.

Roll out in 2010 starting with Basic requirement:-
- Basic Common Induction
- Basic Nuclear Behaviours
- Basic Nuclear Industry Context

Human Performance Training Standards

- UK Human Performance Forum – sponsored by Safety Directors Forum
  - Take account of best practice (nationally and internationally e.g. INPO).
  - Develop qualifications and training across the management spectrum – awareness to site expert.
  - Initial and continuation training to embed and maintain an all pervasive safety culture.
Future Skills

- Plethora of STEM initiatives
  - General STEM
  - Industry and employer specific STEM offerings

- Focus on unique offerings in two areas:
  - Career pathways
  - Nuclear Island Constructionarium

Frameworks

- Existing Apprenticeship Frameworks:
  - Apprenticeship/Foundation Modern Apprenticeship in Specialized Process Operations (Nuclear Options)

- Advanced Apprenticeship/Modern Apprenticeship in Nuclear Decommissioning

Frameworks in Development:

- Nuclear Adult Apprenticeship Framework
- Higher Apprenticeship
- BE Operating Techs
Nuclear Island Pilot

Questions