# Nuclear Technician Apprenticeship End Point Assessment Plan

## Summary

Nuclear Technicians provide technical support to professional engineers and scientists for the day to day operation of plant systems and processes working in a nuclear environment.

This Level 5 apprenticeship will typically take 42 months to complete and on completion Nuclear Technicians will possess the required knowledge, skills and behaviours to carry out a broad range of technical, scientific and engineering tasks to enable systems and equipment to operate safely, efficiently and in an environmentally sustainable way, meeting the requirements set out by the employer and industry regulators.

This assessment plan has been developed by the Nuclear Employer Group specifically set up for the nuclear industry. The group comprises nuclear site licence holders, various companies (large and small) within the supply chain for nuclear and HE providers, who are fully supportive of the approach being undertaken. Several Professional Institutions have also given their support, including: The Royal Society of Chemistry (RSC), Institute of Measurement & Control (InstMC), The Nuclear Institute (NI), Institution of Chemical Engineers (IChemE), Institution of Mechanical Engineers (IMechE).

This assessment plan will ensure that apprentices can progress towards the achievement of Engineering Technician (EngTech) or Registered Science Technician (RSciTech) professional registration with the relevant Professional Institution (PI). EngTech and RSciTech are internationally recognised benchmarks of competence and will allow the apprentices to continue their professional development with mentoring and support provided by the institutions and their employers.

## The End Point Assessment (EPA) will be in two stages:

The responsibility for developing and delivering the EPA rests with the Apprenticeship Assessment Organisations (AAO) approved to offer their services to employers for the Nuclear Technician apprenticeship standard. Only AAO that appear on the Skills Funding Agency (SFA) Register of Apprentice Assessment Organisations (RoAAO) can be used. AAO's must appoint appropriately qualified and experienced assessors to conduct the EPA as defined in this plan.

The EPA will take place during the final 6 months and will be in 2 stages

### Stage 1:

- A **written technical report** on work the apprentice has carried out, demonstrating the apprentice's ability to integrate the broad range of knowledge, skills and behaviours set out in the apprenticeship standard. The apprentice will submit the report prior to structured interview.

### Stage 2:

- An **interview**, consisting of:
    - A presentation by the apprentice on their written technical report
    - A structured discussion supported by the written technical report

The EPA will satisfy the requirements for the registration as an EngTech or RSciTech with the relevant Professional Institution. The structured interview will be carried out by a review panel consisting of 2 members (with one being an independent assessor from the PI). Benchmarking the EPA against the Engineering Council and Science Council UKSPEC means that the assessment outcomes will be consistent, reliable and allow a fair and rigorous comparison between all apprentices employed across the UK in different types and sizes of organisations.

### Note on confidentiality:

As apprentices will be undertaking work in the nuclear industry, it will be important that sensitive nuclear information and client information may have to be removed from any evidence submitted for EPA. Guidance on this should be given to the apprentice by their employer and the employer will be responsible for ensuring that evidence submitted or provided for third party independent review conforms with the employers commercial and regulatory requirements.

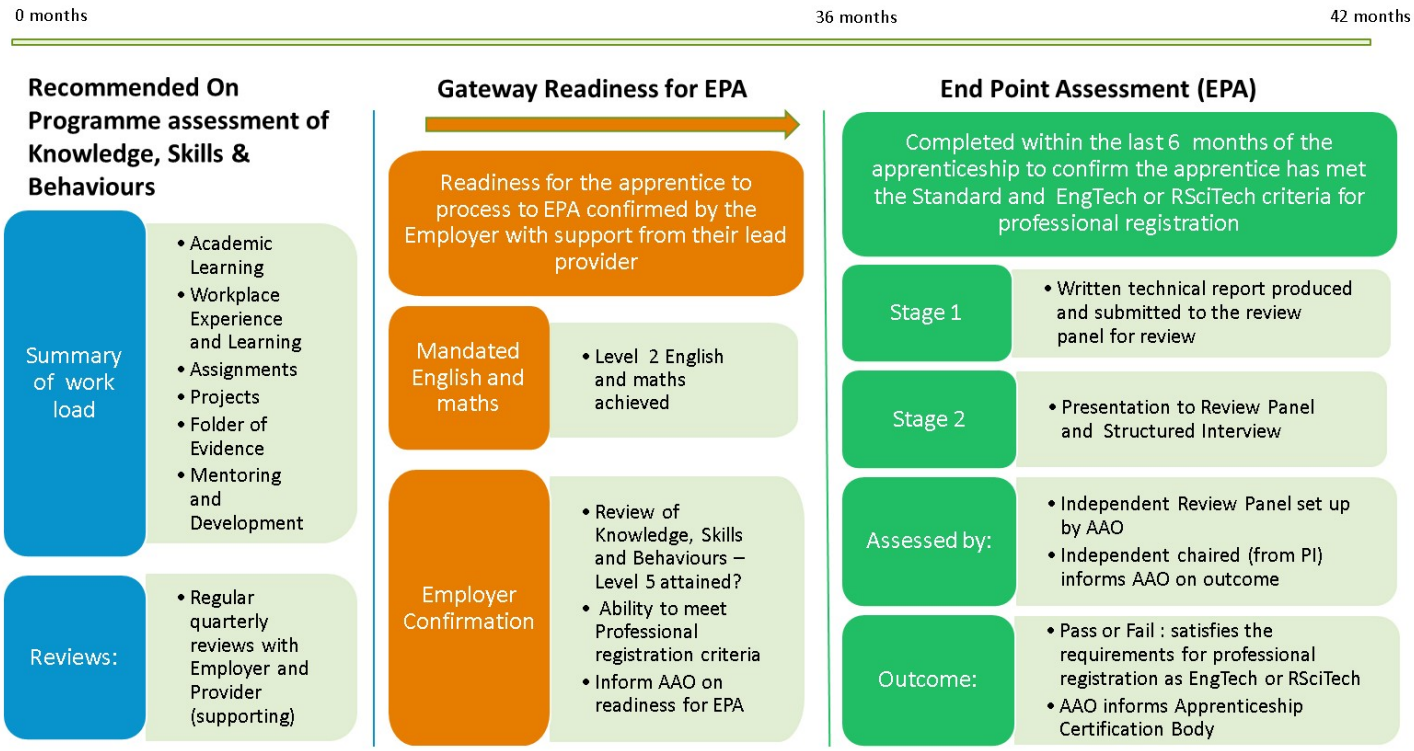
# Nuclear Technician Apprenticeship End Point Assessment Plan

## Diagrammatic representation of the Assessment requirements:

The EPA will be holistic and assess knowledge, skills and behaviours in an integrated way at the end of the programme to provide formal confirmation the apprentice is ready to undertake the occupational role.

## Recommended On Programme Training

The Apprenticeship will typically take 42 months to complete and for EPA readiness it is anticipated that an apprentice without prior knowledge or experience should have completed typically 36 months of their apprenticeship before undertaking the EPA. Having a robust process of on-programme assessment will ensure that apprentices make good progress towards the final EPA.




Whilst not mandatory the following are recognised as best practice to help ensure the apprentices are ready for the EPA:

- A level 5 technical qualification or equivalent during on programme assessment so they can fully demonstrate they are applying the knowledge, skills and behaviours at the level required for the Standard and hence readiness for EPA.
- Apprentices should maintain a folder of evidence against each of the competencies illustrating the application of knowledge, skills and behaviours. The process of collating a folder of evidence will encourage the apprentice to continuously reflect on their learning and development and help to identify gaps where they need to apply further development to achieve the Standard
- Employers should review the progress of their apprentices every 3 months. This can be done in the form of a quarterly review where the apprentice speaks about what they have learned, how they are developing and how they are performing. The employer may act as a mentor in these instances, providing balanced strengths and development-based feedback.

# Assessment Gateway

## Readiness for End Point Assessment (EPA)

Before going forward for the EPA, the apprentice must have:

- Achieved level 2 English and maths
- Satisfactory completed the on programme training plan agreed with their employer
- Collated sufficient evidence that consistently demonstrates their knowledge, skills and behaviours at Level 5, as defined in the Standard

## Who decides if the apprentice is ready for EPA?

The EPA will typically start 36 months into the 42 month apprenticeship programme, once the apprentice has successfully completed appropriate on programme training and assessment.

The judgement on whether the apprentice is ready for the EPA will be made by their employer, on the basis of the knowledge, skills and behaviours attained by the apprentice and taking into consideration the apprentices work experience, the views from the training provider where applicable and the apprentice, to inform this decision.

When satisfied that the apprentice is ready for EPA, the employer will directly (or via their lead provider) inform the AAO for the EPA requirements to be planned and carried out.

# Detailed explanation of the EPA

## What will be assessed?

After successfully achieving the gateway requirements, the apprentice will be expected to demonstrate through a written technical report, presentation and structured interview that they have acquired the broad range of knowledge, skills and behaviours identified in the Standard and can, through their integration, competently undertake the role of a Nuclear Technician.

Annex 1 provides details on how the assessment methods will be used to assess the elements of knowledge, skills and behaviours in the Standard.

## How will it be assessed?

The EPA will use **two** assessment methods:

### Stage 1 A written technical report:

During EPA (and not before) the apprentice will be required to complete and submit a **written technical report** detailing tasks they have undertaken, demonstrating the broad range of knowledge, skills and behaviours in the Standard they have used. For the submission, the Employer will be required to verify that the report produced by the apprentice provides an accurate representation of work carried out by the apprentice.

*Written technical report – the instructions to the apprentice will be to:*

- The report submitted should be a minimum of 3500 and maximum of 5000 words.
- The report does not need to cover every knowledge, skills and behaviour, but must cover a broad breadth of the overall Standard.
- Produce a technical report on tasks undertaken demonstrating where the apprentice solved technical problems, explaining their role; how they selected the appropriate techniques, procedures and methods used. Include in the report should be any scientific, technical or engineering principles used and how recommendations were communicated and agreed for solutions to be developed or put in place. Include steps taken to ensure the safety of plant, personnel and the environment in arriving at your conclusions and solutions.
- In carrying out work tasks, provide details on how the resources were identified, planned and organised to effectively complete the tasks giving a clear explanation on how risks that could impact on the task, personnel, plant and environment were mitigated. Remember to include in the report details about any

equipment used, how data was collected and analysed and how the project was initiated and managed to produce the desired outcome.
- The situations reflected in the report should cover in an integrated way the broad range of knowledge, skills and behaviours required for the Standard.
- Give at least 2 example showing compliance with the Professional Institution's (PI) code of conduct; keeping in touch with develops in the technical discipline area and how continued development of knowledge and skills have been progressed during the apprenticeship.
- The report must be submitted to the review panel at least 2 weeks ahead of the date of the interview

*Generic Content of the written technical report*

There are five generic areas that should be covered in the report to demonstrate the required competence and commitments for Professional Membership, which broadly cover:
- A – Knowledge and understanding
- B – Design and development of processes, systems, services and products
- C – Responsibility, management or leadership
- D – Communication and inter-personal skills
- E – Professional commitment

*Practical Requirements for the written technical report*
- Agreement to be made between apprentice, employer (and provider if appropriate), on the outline of the report to be submitted and reviewed by the independent assessor from the PI.
- The apprentice should be given appropriate time to produce the written report.
- Apprentice to provide a signed statement to confirm it is their own work and for this to be validate by their Employer.

## Stage 2 Interview

The purpose of the **interview** is to enable the apprentice to showcase to the panel how they have carried out the role of a Nuclear Technician, integrating the knowledge, skills and behaviours expected, for the review panel to be assured the apprentice has achieved the requirements of the Standard and has satisfied the requirements for EngTech or RSciTech registration with the relevant Professional Institution.

*The interview will consist of:*

**A Presentation –** by the apprentice summarising on the content of the written technical report submitted, allowing the apprentice to further elaborate on their knowledge, skills and behaviours applied to carry out the work, how any barriers were overcome and reflecting on what they have learned. The presentation should typically be 20 minutes (and not more than 30 minutes) and can be delivered in a manner that the apprentice chooses. This will be followed by the structured discussion with the review panel to enable the panel to ask further questions of clarification on the presentation.

**A Structured Discussion** – between the apprentice and panel, using a set of typical questions developed by the AAO in consultation with the relevant Professional Institution. The structured discussion should typically be up to 45 minutes (and not more than 60 minutes) and focus on the written technical report and presentation and enable the review panel to explore areas they consider warrants further investigation in order to assure themselves that the apprentice has the competence to work as a Nuclear Technician and has met the requirements for EngTech or RSciTech.

The purpose of the presentation and structured discussion is to:
- Seek clarification of any questions the independent assessor has from their review of the written technical report submitted,
- Confirm and validate judgements on how the apprentice has broadly met the knowledge, skills and behaviours in the Standard as indicated in Annex 1.
- Clarify any questions the review panel has from their assessment of the written technical report,
- Explore aspects of the apprentice's work, including how it was carried out, in more detail,
- Determine to what extend the apprentice has met the requirements for Professional Membership and registration.
- Enable the review panel to draw a conclusion on the holistic EPA and the final grade to be awarded.

# Nuclear Technician Apprenticeship End Point Assessment Plan

The **two** methods of assessment will allow the apprentice to demonstrate the knowledge, skills and behaviours acquired and enable the independent assessor the opportunity to make a judgement to what grade the apprentice has met the Standard.

- The written technical report assesses the breadth of the Standard and enables the apprentice to demonstrate their ability to communicate clearly in writing.
- The presentation will give the apprentice further opportunity to explain and show how they have met the Standard, demonstrating their ability to communicate verbally.
- The structured discussion will enable the panel to assess any knowledge, skills or behaviours that were not demonstrated by the apprentice's written technical report or presentation or that require further exploration.

*Practical Requirements for the Interview (Presentation and Structured Discussion)*

- The interview will take place following the completion and submission of the written technical report.
- The apprentice should have at least 2 weeks notice of their interview date and time, to be able to prepare.
- The interview will typically last 60 minutes – and no more than 90 minutes.
- The interview will be conducted face to face or in exceptional circumstances via live media.
- The interview will be conducted in a suitable location that allows for the apprentice to be judged fairly and consistently against other apprentices. This may be at the provider or employer location as appropriate.
- The review panel must put the apprentice at their ease and give the apprentice the opportunity to do their very best.

## Who will carry out the EPA?

### Stage 1 Written Technical Report

The written technical report will be assessed by an independent assessor with the ability to assess at Level 5 and selected by the AAO. The independent assessor will be from a relevant Professional Institution (PI) and will be the independent assessor (acting as Chair) for the Interview in Stage 2.

### Stage 2 Review Panel for the Interview

The panel will consist of 2 members; the employer and the independent assessor (acting a Chair) appointed by the AAO. The employer representative will be an independent discipline expert. The independent assessor must be professionally qualified and registered with the appropriate Professional Engineering or Science Institution and subject to the PI's quality assurance process for membership. This is a tried and tested process within the PI's which are licensed by the Engineering Council or Science Council, the UK regulatory bodies for these professions.

The review panel members will consider the submitted report and agree between themselves the areas to be covered in the interview and relevant key questions to ask the apprentice to confirm the broad range of knowledge, skills and behaviours have been achieved.

At the end of the interview, the independent assessor will make the final judgement and inform the AAO on the decision.

## Final judgement

The final decision about whether the apprentice has passed is made by the AAO.

## Independence

The AAO will coordinate the entire EPA process completely and independently of the employer and any training providers. The independent assessor appointed to carry out the EPA will not be from the apprentice's employer or related to the apprentice in any other way.

The regional arrangement will ensure that all apprentices are within reasonable travelling distance of the venue for the structured interview. Where practicable the interview will be arranged at the employers or their provider's premises to minimise additional expenditure, travel and time away from the work place

## EPA – Summary of review panel responsibilities

There will be a minimum of 2 members involved; the independent assessor (chair) and the employer discipline expert.

| Assessor | Role responsibilities |
|---|---|
| **Employer** | Brings a view of the apprentice from the perspective of:<br>• Supporting and mentoring during the apprenticeship<br>• Helping the apprentice to reflect on their performance and achieve appropriate milestones during on programme assessment<br>• Providing the interface with the Professional Institution for Professional Membership and continued professional development<br>• Assessing the readiness of the apprentice for EPA<br>• Formally putting forward the apprentice for EPA and submitting the appropriate information<br>• Ensuring the apprentice is responsible for producing their written technical report and presentation for EPA<br>• Provide the apprentice with the appropriate preparation for the interview<br>• Provides the discipline expert who sits on the EPA face to face interview panel |
| **Independent Assessor** | The independent assessor will have no prior engagement with the apprentice and will:<br>• Review the written technical report and marks in accordance with the criteria required by the AAO and relevant Professional Institution<br>• Chair and conduct the interview<br>• Make the final judgement on the outcome of the EPA taking into consideration the views of the interview panel<br>• Provide the outcome of the EPA to the AAO |
| **Apprenticeship Assessment Organisation (AAO)** | • Registered on the SFA RoAAO<br>• Appoints and ensures independent assessors are competent for the role<br>• Sets and administer the arrangements for EPA of apprentices with independent assessors<br>• Demonstrates effective quality assurance processes are in place (including that the EPA is fair, reliable and consistently carried out across organisations and over time)<br>• Works with the relevant Professional Institutions to ensure guidance on the criteria for written technical report and presentation and interview for the EPA and Professional Membership are available to employer and apprentices<br>• Informs the outcomes of apprentice EPA's to the Apprenticeship Certification Body |

# Quality Assurance

## Internal QA

The AAO for the Nuclear Technician EPA will be responsible for the internal quality assurance and will have suitable and appropriate quality assurance processes in place so that all aspects of the EPA are carried out in a consistent and fair manner for all Apprentices. The QA arrangements will typically include:

- The management of risk and malpractice/maladministration, appeals and complaints
- Communication processes for apprentices, employers, providers, and external bodies in relation to the EPA
- Third parties - the management of third parties, including independent review panel members, examiners, assessors
- Information about fees, clarity of invoicing
- Setting and delivering panel assessment - need for confidentiality, reasonable adjustments and special consideration
- Marking and issuing results - marking and moderation, results determination and issuing
- Standardisation meetings to support and develop independent assessors; monitor and improve the quality of assessment practice; and remove / minimise process inconsistencies. The AAO will

determine the frequency and timing of internal standardisation activity required and this must be undertaken at least once a year.

The AAO will set the assessment criteria for the Written Technical Report, Presentation and Structured Discussion, working with the relevant Professional Institutions to ensure alignment and eligibility for Professional Membership and registration with the Engineering or Science Council.

Only independent assessors appointed by the AAO are able to carry out the EPA. Independent Assessors must be:

- Occupational competent
- Registered with an appropriate Professional Institution for the apprenticeship

### External QA

External quality assurance of the EPA for this apprenticeship standard will be managed by the Institute for Apprenticeships (IfA).

## Grading

A grading exemption has been granted for the Nuclear Technician Apprenticeship due to the link to professional registration. A 'Pass' or 'Fail' will be awarded. A pass will mean the apprentice has demonstrated the ability to meet competences described in the Engineering Council's or Science Council's UK-SPEC criteria for EngTech or RSciTech:

http://www.engc.org.uk/

http://sciencecouncil.org/

For the conclusion of the EPA, the final judgement on the overall grading of the apprentice rests with the independent assessor (from the relevant Professional Institution) appointed by the AAO.

## Implementation

### Affordability

The major costs for delivering the Nuclear Technician Apprenticeship are:

- The On Programme training and assessment, including:
  - Level 5 academic learning and assessment
  - Work related project to support the level 5 academic learning
  - Managing Safety course or equivalent
  - Nuclear Awareness training course
  - Human Performance fundamentals training course
  - The ongoing support and progress monitoring of the individual apprentices
- The Holistic EPA, including
  - Logging applications for EPA and approval of technical report outline
  - Appointment and registration of appropriate independent assessors
  - The review panel for the interview
  - Carrying out assessment and marking
  - Venue costs for the interview to be carried out
  - Assessor costs (assessing written submissions, carrying out interview and writing up report)
  - The quality assurance of all the processes involved in the delivery and assessment to ensure rigour and consistency
  - External quality assurance payment
  - General administration of the process

The cost of the holistic EPA is estimated to be of the order of 15% of the overall cost of the Nuclear Technician Apprenticeship.

### Professional Body recognition

This is embedded in the EPA process. The AAO will appoint an independent assessor to review the Written Technical Report and to chair the Interview. The independent assessors will be professionally qualified and

registered with the relevant Professional Institution (PI). The EPA will determine that the apprentice has satisfied the requirements for Professional Membership and eligible to be registered as an Engineering Technician (EngTech) or Registered Science Technician (RSciTech).

## Consistent

The Nuclear Employer Group recognises that the EPA is open to AAO registered on the SFA RoAAO. The AAO will be responsible for ensuring that the independent assessor with the final judgement on the apprentice is from a relevant Professional Institution. The internal and external quality assurance processes mean that the EPA outcomes will be consistent and reliable, allowing a fair and proper comparison of apprentices employed in different types and sizes of organisations.

## Volumes

The employer group estimates that the initial yearly volumes will be the order of 20 and may increase to 70 in future years.

# Nuclear Technician Apprenticeship End Point Assessment Plan

**Annex 1**

**Assessment Method by element of the Standard – Nuclear Technician**

**Note: The Interview Panel should be satisfied that the Knowledge, Skills and Behaviours have been broadly covered by the Apprentice, to ensure competence in the occupational role.**

| | **Apprenticeship Standard competencies** | **Designated method of assessment or combination** | |
|---|---|---|---|
| **Ref** | **Knowledge to be assessed** | **W = Written Technical Project Report** | **I = Interview (includes Presentation & Professional Discussion)** |
| **K1** | The concepts, principles and theories of engineering science relevant to the interdisciplinary fields of nuclear technology | **W** | |
| **K2** | Relevant stakeholders, commercial and business acumen, business improvement process, project and business management techniques relevant to the nuclear industry | **W** | **I** |
| **K3** | Science or engineering discipline knowledge to support the development of operation, maintenance and progression of technologies for example in Decommissioning (e.g. remote handling and robotics), Waste Management, Reprocessing, and Nuclear Power Generation | **W** | **I** |
| **K4** | How to engage with and support the successful outcome of nuclear projects | **W** | |
| **K5** | How to analyse and apply the results of research and information gathering to evaluate and to propose solutions to a particular nuclear technology application | **W** | |
| **K6** | The regulatory requirements for both national and international and its relevance to the job role | | **I** |
| **K7** | The nuclear industry (past, present and future) and the business, political and community environment in which the company operates including personal role within the organisation, ethical practice and codes of conduct | | **I** |
| **K8** | How to implement methods of determining the root cause of problems and demonstrating knowledge of learning from experience (LFE) processes | **W** | |
| **K9** | The technology, safety, environmental and economics for a variety of nuclear scenarios for example the nuclear fuels, the nuclear fuel cycle | **W** | **I** |
| **K10** | How the standards for nuclear professional practice as required by the industry and professional body institutions are applied | **W** | |
| **Ref** | **Skills to be assessed** | **W = Written Technical Project Report** | **I = Interview (includes Presentation & Professional Discussion)** |
| **K1** | Work competently and safely in a technical nuclear environment, understand and promote personal responsibility for Health, Safety, Radiation Protection, Environmental Protection, Quality, Security, Safeguards and principles of Risk Management | **W** | **I** |
| **K2** | Utilise mathematical, engineering and scientific tools to provide suitable solutions to nuclear applications | **W** | **I** |
| **K3** | Accurately observe, record and draw conclusions from data and experimental evidence and presentation of findings under supervision | **W** | |

| | | | |
|---|---|---|---|
| **K4** | Develop and write technical reports that meet business requirements including the optimisation and continuous improvement of processes and services | **W** | |
| **K5** | Utilise Information Technology (IT) for performing and supporting the business processes including, communications, work co-ordination, task analysis and problem solving | **W** | |
| **K6** | Promote and actively support the application of quality standards relevant to the workplace and organisation | **W** | **I** |
| **K7** | Demonstrate decision making ability commensurate with agreed levels of responsibility | **W** | **I** |
| | **Behaviours to be assessed** | **W = Written Technical Project Report** | **I = Interview (includes Presentation & Professional Discussion)** |
| **B1** | **Communication:** Communicate effectively and appropriately at all levels within the organisation, using a broad range of communication skills (including written, oral, presentation and active listening). | | **I** |
| **B2** | **Integrity:** Demonstrate reliability, integrity and respect for confidentiality on work related and personal matters | **W** | **I** |
| **B3** | **Team Working:** Demonstrate ability to work effectively within a wide, multi-disciplinary team | **W** | **I** |
| **B4** | **Personal Responsibility:** Understand the impact of work on others, especially where related to diversity and equality | | **I** |
| **B5** | **Planning & Quality:** Demonstrate ability to work to a plan and deliver quality work to meet an agreed schedule | **W** | **I** |
| **B6** | **Supportive Attitude** Demonstrate a supportive attitude to change and respond positively to change management processes | | **I** |
| **B7** | **Personal Development** Take responsibility for personal development, demonstrating commitment to learning and self-improvement and be open to feedback | | **I** |
| **B8** | **Nuclear Safety** Demonstrate a strong commitment to personal safety behaviours and understanding of the consequences as set out in the nuclear industry requirements | | **I** |
| **B9** | **Challenge:** Take responsibility to actively challenge unsafe behaviours and conditions in the workplace to help reinforce nuclear, radiological and conventional safety over competing goals to ensure the protection of people and the environment | | **I** |
| **B10** | **Compliance & Security:** Demonstrate compliance by following rules, procedures and principles to ensure work completed is fit for purpose and pay attention to detail and carry out error checks throughout work activities | **W** | **I** |
| **B11** | **Industry Advocate:** Be an enthusiastic advocate for the nuclear industry with the ability to represent this industry to a variety of audiences | | **I** |