ENERGY & UTILITY SKILLS

Skills for a greener world

EUIAS EPA Supporting Documents for

Level 4 Electrical Power Protection and Plant Commissioning Engineer
QAN 610/1604/4

EUSR

ENERGY & UTILITIES INDEPENDENT ASSESSMENT SERVICE

ENERGY & UTILITIES jobs

ENERGY & UTILITY SKILLS PARTNERSHIP

NSAP

EUIAS EPA Supporting Documents for

Level 4 Electrical Power Protection and Plant Commissioning Engineer

QAN 610/1604/4

Updates to the supporting documents

Since the first publication of the EUIAS Electrical Power Protection and Plant Commissioning Engineer Supporting Documents, the following updates have been made.

Version	Date first published	Section updated	Page(s)
V2.0	August 2023	Rebranded	All
V1.0	April 2023	First created	All

Appendix A: Glossary

Amplification – provides more detail on how individual knowledge, skills or behaviours statements should be interpreted. Where the KSB statements, themselves are deemed self-explanatory, no amplification is provided. Assessment may include questions on anything identified in the amplification

Behaviours (as part of KSBs) – specific mindsets, attitudes or approaches identified as part of the apprenticeship standard that must be evidenced during end-point assessment

Elements – are the knowledge, skills and behaviours and what is needed to competently undertake the duties required for an occupational standard

Gateway - the stage of the apprenticeship where the apprentice, employer and training provider determine whether the apprentice is ready to undertake end-point assessment

Guidance – is only provided where it is required to support interpretation of the KSB statements

Knowledge (as part of KSBs) – specific information, technical detail, and 'know-how' identified as part of the apprenticeship standard that must be evidenced during end-point assessment

Pathways – a specialist route within an apprenticeship standard that builds on the occupational competence for a new entrant to the occupation

Skills (as part of KSBs) – the practical application of knowledge identified as part of the apprenticeship standard that must be evidenced during end-point assessment

Standard – An occupational standard is a description of an occupation. It contains occupational profile, and describes KSBs needed for someone to be competent in the occupation's duties. Occupational standards are developed by employers for occupations that meet the Institute for Apprenticeships and Technical Education current occupation criteria

Topic - is a collection of elements grouped into a theme e.g. Health and Safety

Appendix B: Gateway Eligibility Form

(Standard Version: ST0157 version 1.0 ; Assessment Plan Version: AP02)

Apprentice's name:	Apprentice's job title:
Name of Employer:	Name of Training provider:
Employer representatives present:	Training provider representatives present:
Apprenticeship start date:	Apprenticeship on-programme end date:
Gateway meeting date:	
Has the apprentice taken any part of the end-point assessment for this apprenticeship standard with any other End Point Assessment Organisation?	Y / N
If "Yes" please give details:	

Apprentice's details

Eligibility requirements:
The apprentice must confirm their achievement of the following:

Eligibility requirement	Achieved by the apprentice? Y/N	Evidence (Scans of certificates MUST be included)
Achieved Level 2 English or higher		
Achieved Level 2 Maths or higher		
Satisfactory completion of the formal training plan agreed with apprentice by the employer		
Compiled and submitted a work log of evidence on which the interview will be based		

Gateway Eligibility Declaration

The apprentice, the employer and the training provider must sign this form to confirm that they understand and agree to the following:

1. The apprentice has completed the required on-programme elements of the apprenticeship and is ready for end-point assessment with EUIAS.
2. EUIAS has been informed about any reasonable adjustment and/or special considerations requests.
3. The apprentice will only submit their own work as part of end-point assessment.
4. All parties agree that end-point assessment evidence may be recorded and stored by EUIAS for quality assurance purposes.
5. The apprentice has been on-programme for a minimum duration of 365 days.
6. The apprentice has achieved English and maths Level 2 or higher as detailed in this document.
7. The apprentice satisfactorily completed a formal training plan agreed by the employer.
8. The apprentice has produced a work log which includes a mapping document. The mapping document has been placed at the front of the work log and submitted to EUIAS.
9. The apprentice, if successful, gives permission for EUIAS to request the apprenticeship. certificate from the ESFA who issue the certificate on behalf of the Secretary of State.
10. The apprentice has been directed to the EUIAS Appeals Policy and Complaints Policy.
11. The employer/training provider has given the EUIAS at least three months' notice of requesting this EPA for this apprentice.
12. If the Gateway Eligibility Report is not completed in full, meeting all requirements, and submitted to EUIAS, the end-point assessment cannot take place.

Signed on behalf of the employer (print name):	Signature:	Date:
Signed on behalf of the training provider (print name):	Signature:	Date:
Apprentice's name (print):	Signature:	Date:
EUIAS use only:		
EUIAS Sign off:		
Comments/actions:		

Appendix C: Practice questions for Knowledge Assessment

Level: 4

Electrical Power Protection and Plant Commissioning Engineer
SAMPLE Practice Assessment
Covering Distribution and Transmission Voltages

Knowledge Assessment Details

The live assessment consists of 20 short answer questions with 5 questions for each of the 4 topic areas shown below. Each of these topic areas will contain 1 **safety critical question.**

The 4 topic areas are as follows:

1. A comprehensive understanding of electrical power systems
2. Understands protection, control and telemetry equipment and the impact on the electrical network of its operation
3. Understands high voltage electrical network operations and topologies
4. Understands the application of Electricity Supply Standards, regulations and policies

The live assessment has a maximum duration of 2 hours 30 minutes. Consequently, each topic area should take approximately 30 – 35 minutes to complete with each short answer question taking approximately 6 minutes to answer. You are advised to start with the safety critical questions and spend more time on them if required. Not passing a safety critical question will result in an overall fail.

Each topic area is marked out of 40 marks.

To attain a Pass, the apprentice must:

- Score at least 65% (104 marks)
- Must achieve 5 marks in each of the four safety-critical questions.

To attain a Distinction, the apprentice must meet the Pass criteria AND:

- Score at least 90% (144 marks)

ENERGY & UTILITIES INDEPENDENT ASSESSMENT SERVICE

You may use this page for rough work

Section 1: A comprehensive understanding of electrical power systems

Practice Q1

a) i) Draw a simple diagram of a ring power circuit. [1 mark]

ii) Draw a simple diagram of a radial power circuit. [1 mark]

b) i) Describe the design principles of ring power circuits. [2 marks]

ii) Describe the design principles of radial power circuits. [2 marks]

c) i) Identify one **advantage** of a radial power circuit. [1 mark]

ii) Identify one **disadvantage** of a radial power circuit. [1 mark]

Total 8 marks

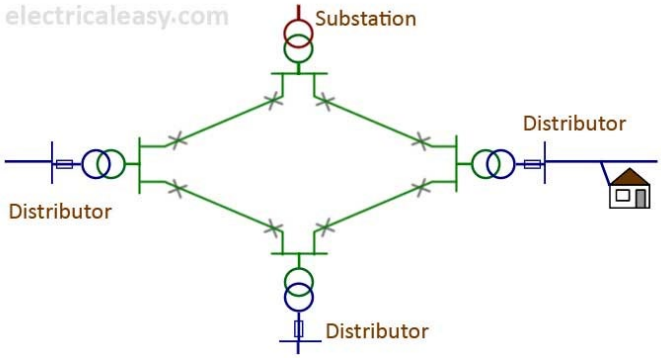
	Mark	Max
a)		**2**
b)		**4**
c)		**2**
Total		**8**

Mark Scheme:

Q1

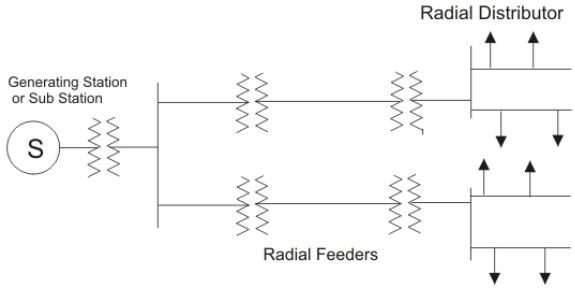
a) i) **A simple diagram** demonstrating the design principles of ring circuits (1 mark)

Note: this diagram is for assessors only. The diagram provided by the apprentice will be simpler.



ii) **A simple diagram** demonstrating the design principles of radial circuits (1 mark)

Note: this diagram is for assessors only. The diagram provided by the apprentice will be simpler.



b) i) **A technical description of design principles of ring circuits,** 1 mark each to a maximum 2 marks:

- Designed to make a ring of the main circuit with more than one potential feed (1 mark)
- Provides ability to feed from either direction in the circuit (1 mark)
- Provides ability to make open / interconnection points in the circuit (1 mark)

ii) **A technical description of design principles of radial circuits,** 1 mark each to a maximum 2 marks:

- Designed to make a single feed linear circuit (1 mark)
- Provides ability to feed from either direction in the circuit (1 mark)
- Provides ability to make open / interconnection points in the circuit (1 mark)

c) i) **Identification of one advantage of a radial circuit,** 1 mark:

- Reduced costs of construction and maintenance as only a single supply (1 mark)
- Simpler fault-finding process because only a single one direction supply (1 mark)
- Cost effective option for supplies to remote locations (1 mark)

ii) **Identification of one disadvantage of a radial circuit,** 1 mark:

- Limited network flexibility for the restoration / isolation of customer supplies as no option to backfeed (1 mark)
- Potentially takes longer to restore supplies and more customers adversely affected as whole feed must be isolated (1 mark)

These answers are not exhaustive, and all submitted responses should be considered on their merit.

Section 2: Understands protection, control and telemetry equipment and the impact on the electrical network of its operation

Practice Q2

a) Describe the purpose of voltage transformers (VT) found in power substations. [2 marks]

b) Explain the typical process which occurs when a voltage transformer (VT) is activated by a fault on the network. [4 marks]

You may use a diagram to support your explanation.

Note: Full marks can be achieved without a diagram.

c) List **two** types of voltage transformer (VT) found in power substations. [2 marks]

Total 8 marks

	Mark	Max
a)		**2**
b)		**4**
c)		**2**
Total		**8**

Mark Scheme:

Q2

a) **Technical description of purpose of voltage transformers (VT) in a power substation,** 1 mark each to maximum 2:

- To reduce the voltage to a manageable level for the equipment being used (1 mark)
- To monitor and control the transformer automatic voltage regulating relay (AVR) which controls the tap changer (1 mark)
- To supply power to volt meters and watt meters (1 mark)

b) **Technical explanation of the process which occurs when a voltage transformer (VT) is activated by a fault,** 1 mark each to maximum 4:

- Voltage transformers can be used to measure the residual voltage (1 mark) of a three-phase system (1 mark) during single phase faults (1 mark)
- During normal operating conditions, the sum of the three-phase voltage (1 mark) is zero but in case of single-phase fault, the condition changes (1 mark) and a residual voltage is produced (1 mark)
- Suitable diagram to support explanation (1 mark)

c) **Types of voltage transformer (VT) listed**, 1 mark each to maximum 2:

- Capacitor VT (1 mark)
- Single Phase VT (1 mark)
- Inductive VT (1 mark)

These answers are not exhaustive, and all submitted responses should be considered on their merit.

Section 3: Understands high voltage electrical network operations and topologies

Practice Q3 This question is safety critical

Transmission systems employ Delayed Auto-Reclose (DAR) technology and distribution systems employ Auto-Reclose (AR) technology.

a) State the purpose of the Auto-Reclose system, relevant to your network. [1 mark]

b) Explain a typical cycle of operation of the Auto-Reclose system, relevant to your network. [6 marks]

You may use a diagram to support your explanation.

Note: Full marks can be achieved without a diagram.

c) Identify one **advantage** that Auto-Reclose technology provides. [1 mark]

Total 8 marks

	Mark	Max
a)		**1**
b)		**6**
c)		**1**
Total		**8**

Mark Scheme:

Q3

a) **The purpose of DAR or AR,** 1 mark:

To provide fast and efficient network protection (1 mark)

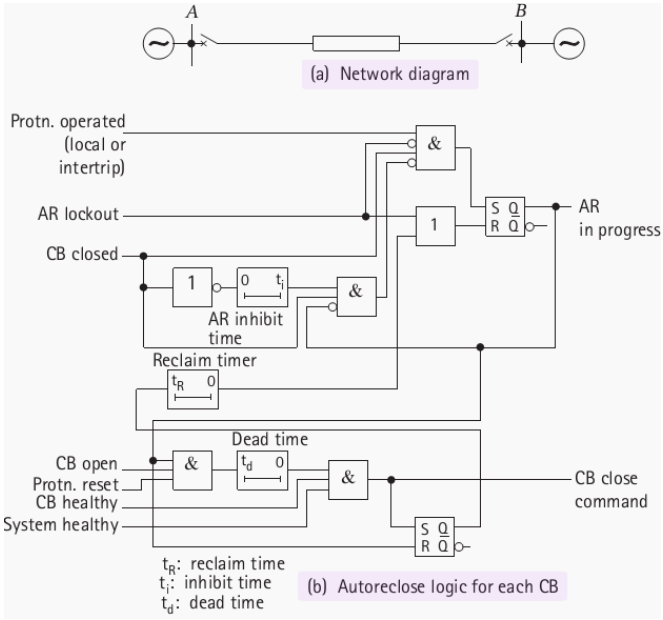
b) **Explanation of a typical cycle of operation,** 1 mark each to a maximum 6:

In the example below, if it were decided to charge the line initially from station A, the dead time in the auto-reclose relay at A would be set at, say, 5 seconds (1 mark), while the corresponding timer in the auto-reclose relay at B would be set at, say, 15 seconds (1 mark). The circuit breaker at A would then reclose after 5 seconds (1 mark) provided that voltage monitoring relays at A indicated that the busbars were alive (1 mark) and the line dead (1 mark).

With the line recharged (1 mark), the circuit breaker at B would then reclose with a synchronism check (1 mark), after a 2 second delay imposed by the synchronism check relay element (1 mark).

If for any reason the line fails to 'deadline charge' from end A (1 mark), reclosure from end B would take place after 15 seconds (1 mark). The circuit breaker at A would then be given the opportunity to reclose with a synchronism check (1-mark).

1 mark for suitable diagram [diagram may be simple or may include information about a typical cycle of operation which can be awarded marks as identified above]



c) **Advantage that Auto-Reclose technology provides,** 1 mark each to a maximum of 1**:**

- To prevent loss of power (1 mark)
- To detect temporary or permanent faults (1 mark)
- To provide quick and efficient restoration of supplies (1 mark)
- Simplifies control circuits in comparison with single-phase schemes (1 mark)
- Delayed auto-reclosing improves the chances of a reclosure being successful in comparison to the case of high-speed reclosing (1 mark)

These answers are not exhaustive, and all submitted responses should be considered on their merit.

Section 4: Understands the application of Electricity Supply Standards, regulations and policies

Practice Q4

The Electricity at Work Regulations 1989 apply to all electrical systems and equipment and require precautions to be taken against the risk of death or personal injury from electricity in work activities.

a) Describe the general requirements of Regulation 11 relating to the means of protection from excess current. [7 marks]

b) Identify **one** of the specified conditions, stated in Regulation 14, which must be met before live work could be considered on or near live conductors. [1 mark]

Total 8 marks

	Mark	Max
a)		**7**
b)		**1**
Total		**8**

Mark Scheme:

Q4

a) **Description of Regulation 11 requirements for the protection of electrical systems from excess current,** 1 mark for each requirement to a maximum 7 marks:

The regulations require that systems and parts of systems be protected against the effects of short circuits and overloads if these would result in currents which would otherwise result in danger.

- The regulations state the means of protection is likely to be in the form of fuses or circuit breakers controlled by relays (1 mark), or it may be provided by some other means capable of interrupting the current or reducing it to a safe value (1 mark)
- That a means of preventing danger to be provided in anticipation of excess current (1 mark)
- That in principle, every main circuit should be protected at its origin (1 mark), i.e. at the source end of the circuit (1 mark)
- That when considering a means of protection, consideration must be given to a number of factors, including:
  - the nature of the circuits (1 mark)
  - type of equipment to be protected (1 mark)
  - the short-circuit energy available in the supply (the fault level) (1 mark)
  - the nature of the environment (1 mark)
  - whether the system is earthed or not (1 mark)

b) **Regulation 14 requirements which must be met before live work could be considered on or near live conductors,** to a maximum 1: Identification of one of the following principles.

- it is unreasonable in all the circumstances for it to be dead (1 mark)
- it is reasonable in all the circumstances to be at work on or near
- it while it is live (1 mark)
- suitable precautions, including where necessary the provision of suitable
- protective equipment (1 mark), are taken to prevent injury (1 mark)

These answers are not exhaustive, and all submitted responses should be considered on their merit.

Appendix D – Work Log Mapping Document

Introduction

Throughout the on-programme part of the apprenticeship, the apprentice will need to keep compile a work log of evidence to support the requirements of the interview. The evidence within the work log will need to be mapped to the KSB requirements using the mapping document overleaf.

Apprentice's next steps

1. Complete all the details on the first page and include employer details of where relevant competencies from their experience at work was gained.
2. The apprentice can use a number of different types of evidence to demonstrate their competence as described in Section 5 of the Specification – 'What to include in the work log?'. For further guidance, the apprentice must seek advice from their tutor/supervisor/mentor and training provider.
3. Map evidence to the criteria in the following pages using a referencing system indicating where the evidence for the criteria is located in the work log e.g., work based evidence Job 1 (J1) page 5 paragraph 2. This will allow the independent assessor to locate the section or specific piece of evidence being discussed and referred to during the technical interview.
4. Place the work log mapping document at the front of the work log of evidence.

The apprentice's training provider must make arrangements for EUIAS to have access to the apprentice's work log including the work log mapping document at least 2 weeks before the technical interview. For apprentices using e-work logs such as ONEFILE, SMARTASSESSOR, the reference used must simply be the file or folder name you used when uploading the evidence to such systems.

Work log Mapping Document

Mapping Sign off on Work log Completion:

Apprentice Name (Print)	Apprentice Signature	Training Provider (Company)	Training Provider Signatory	Date of Sign Off

GROUP 1: Technical Knowledge

Ref.	Apprenticeship Standard Criteria	WORK LOG EVIDENCE REFERENCE (Apprentice Input)		
		1	2	3
CTK1	A comprehensive understanding of electrical power systems			
CTK2	Detailed understanding of the application/operation of relevant plant and equipment			
CTK3	Fault analysis methods in order to interpret results			
CTK4	How high voltage power generation, transmission and distribution plant and equipment operates			
CTK5	Understands protection, control and telemetry equipment and the impact on the electrical network of its operation			
CTK6	Understands commissioning and testing procedures and processes			
CTK7	Understands failure mode(s) of plant and equipment and the impact on the electrical network and the knowledge to identify required remedial actions			
CTK8	Understands high voltage electrical network operations and topologies			

Ref.	Apprenticeship Standard Criteria	WORK LOG EVIDENCE REFERENCE (Apprentice Input)		
		1	2	3
CTK9	Understands high voltage safe systems of work and risk management			
CTK10	Understands the application of Electricity Supply Standards, regulations and policies			
CTK11	Understands test equipment to select appropriate equipment for commissioning			

GROUP 2: Core Skills

Ref.	Apprenticeship Standard Criteria	WORK LOG EVIDENCE REFERENCE (Apprentice Input)		
		1	2	3
CS1	Applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant and equipment			
CS2	Demonstrate application of safe working practices in line with company processes and legislative requirements			
CS3	Uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service			
CS4	Prepares and checks technical reports			

GROUP 3: Specific Plant Skill

Ref.	Apprenticeship Standard Criteria	WORK LOG EVIDENCE REFERENCE (Apprentice Input)		
		1	2	3
PL1	Undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment			

GROUP 4: Specific Protection Skill

Ref.	Apprenticeship Standard Criteria	WORK LOG EVIDENCE REFERENCE (Apprentice Input)		
		1	2	3
PR1	Undertakes functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system			
PR2	Uses appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection which may include older electromechanical relays.			
PR3	Ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system			

Appendix E: Practical Observation Planning Sheet

Instructions

This form has two purposes:

1. To help you plan a practice Practical Observation for your apprentices
2. To inform EUIAS of the proposed task(s) for the live assessment

The apprentice is assessed in a working environment. The Practical Observation is typically be one day depending on the activity(s). The actual time allowed will be based on the comparable time an industry competent worker would take to achieve successful task(s) completion

Equipment and resources needed for the assessment must be in good and safe working condition.

The activities should be designed to assess a broad range of the skills, knowledge and behaviours developed over the period of the apprenticeship. However, as a minimum the practical observation must cover the activities and KSBs listed in the Planning Form below.

EUIAS offers a service to review the employer/training provider's Practical Observation task brief.
Task variations: If you have more than one apprentice being assessed, use the "Practical Task variations" section of the form to indicate what the task variations that will be put in place so that apprentices are not asked to complete identical tasks.

Complete the 'Level 4 Electrical Power Protection and Plant Commissioning Engineer Practical Observation Planning Form' and submit it to the Service Delivery team via enquiries@euias.co.uk, for **review 1 month before the start** of the end-point assessment

Level 4 Electrical Power Protection and Plant Commissioning Engineer Practical Observation Planning Form

Employer name and site address:	
Training provider (if applicable)	
Standard:	**Electrical Power Protection and Plant Commissioning Engineer Practical**
Level	**4**
Location of practical	
Summary of activity: Please provide a brief summary of the overall task/s to be completed during the assessment period	
Contact Details: Employer/training provider representative, email address and contact number overseeing the setup of the competency test (documents and site).	
Date submitted to EUIAS	

Estimated total duration of practical task(s) must be typically one day.

Please state time for the practical task(s):

_____

Practical Observation Checklist

This checklist will assist the employer and/or training provider with planning the activity. Please confirm all required elements are covered:

Core skills to be covered in the task	Covered on activity
Please use the space below to provide a summary of the planned practical observation activities for each criterion.	
Explain how the apprentice will meet: **CS1** Applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant & equipment	☐
Explain how the apprentice will meet: **CS2** Demonstrate application of safe working practices in line with company processes and legislative requirements	☐
Explain how the apprentice will meet: **CS3** Uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service	☐

Core skills to be covered in the task	Covered on activity
Explain how the apprentice will meet: **CS4** Accurately reads and interprets a wide range of engineering diagrams and drawings	☐
Explain how the apprentice will meet: **CS6** Effectively communicate with others to confirm that the tests meet the required standards/specifications	☐

Specific plant skills to be covered in the task	Covered on activity
Please use the space below to provide a summary of the planned practical observation activities for each criterion.	
Explain how the apprentice will meet: **PL1** Undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment	☐

Specific protection skills to be covered in the task	Covered on activity
Please use the space below to provide a summary of the planned practical observation activities for each criterion.	
Explain how the apprentice will meet: **PR1** Undertakes functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system	☐
Explain how the apprentice will meet: **PR2** Uses appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection which may include older electromechanical relays.	☐
Explain how the apprentice will meet: **PR3** Ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system	☐

Core behaviours to be covered in the task	Covered on activity
Please use the space below to provide a summary of the planned practical observation activities for each criterion.	
Explain how the apprentice will meet: **B1** Team working: safely working as a member of a team to achieve required outcomes within time, cost, quality and budget constraints	☐
Explain how the apprentice will meet: **B2** Interpersonal skills: able to relate to people at all levels and take others' views into account to ensure the best possible outcome	☐
Explain how the apprentice will meet: **B3** Communication: confident and effective communicator both verbally and in writing ensuring that all parties understand	☐
Explain how the apprentice will meet: **B4** Problem solving: pro-actively identifies and solves problems, within personal area of expertise, by using a logical and systematic approach	☐

Core behaviours to be covered in the task	Covered on activity
Explain how the apprentice will meet: **B5** Methodical: identifies and applies procedures and processes as appropriate to the situation	☐
Explain how the apprentice will meet: **B6 O**wnership: takes personal responsibility for the work of themselves and others under their control	☐

Practical Task Variations - Describe how you can vary this task/s to ensure that the assessment does not become predictable.

Variation 1:

Variation 2:

Variation 3:

Specific requirements (for example: authorisations/access arrangements/PPE):

Remember:

- The specific detail of the tasks to be undertaken should be **kept confidential from the apprentices**

Practical Task: Include relevant photographs to illustrate task(s)

EUIAS Office use only

Date received	
Date signed off	

Appendix F: Practice Observation Template

.

Name of Apprentice	
Location(s) of Practice Observation	
Name of Assessor	
Date of Practice Observation	
Start Time	
End Time	
Assessor additional comments	

	Grade
Please indicate the apprentice's practice observation grade (F/P/D):	

Please Note:

To achieve a Pass, the Apprentice must achieve all the pass descriptors.

To achieve a Distinction, the Apprentice must achieve all the pass descriptors plus all the distinction descriptors.

Fail: the apprentice does not demonstrate the pass descriptors.

Electrical Power Protection and Plant Commissioning Engineer
Practical Observation Checklist and Standardised Questions

Assessment Guidance

During the Practical Observation process each apprentice must be observed by a Assessor undertaking practical activities in a working environment.

The Assessors conducting the assessment may be required to personally supervise the apprentice, for example when working on live equipment and therefore must hold the appropriate safety rule authorisation to undertake the activities being undertaken and be authorised by the organisation that owns the premises where the observation is being conducted.

At appropriate times during the observation the assessor should conduct questioning to confirm knowledge and understanding of the topic area and record a brief summary of the questions asked and the responses given on the paperwork provided for each element. In addition to the practical observation it is a requirement that each apprentice is asked a range of industry devised questions for the activity being observed, with further follow up questions being asked by the assessor where required. These questions should be contextualised to the apprentice's job role and the specific work activity being observed

In addition to the practical observation of work, to attain a **PASS** the apprentice must provide sufficient information to correctly answer a minimum of **1** of the questions provided for each of the elements. On completion of each element the assessor should provide a brief justification for their final awarded grade on the paperwork provided.

Rules of Element Achievement for the Practical Observation

To achieve a **PASS** in an element the apprentice must demonstrate sufficient evidence to achieve **ALL** of the given **PASS** criteria and correctly answer a minimum of **1** of the questions provided in the elements.

To achieve a **DISTINCTION** in an element the apprentice must achieve a **PASS** as detailed above and then further demonstrate sufficient evidence to achieve a minimum of **2** of the given **DISTINCTION** criteria during the observation.

Guidance for the assessor

To achieve a **PASS** the apprentice must achieve **ALL** of the following by providing evidence to demonstrate:	P	To achieve a **DISTINCTION** a minimum of 2 criteria must be achieved by providing evidence which demonstrates:	D
A working knowledge of the relevant Company engineering processes which are applicable to both normal and abnormal work situations / conditions	☐	A detailed technical knowledge and understanding of the relevant Company engineering processes which are applicable to both normal and abnormal work situations / conditions	☐
Their ability to choose and follow the appropriate policy and procedure to achieve the engineering objectives required for the activity (AP)	☐	Their ability to make suggestions for improvement which support / enhance the outcome of the work activity (AP)	☐
Their ability to apply an organised and analytical approach to achieve the engineering objectives required for the activity	☐	Their ability to challenge / question processes which may adversely affect the effectiveness of the work activity	☐
The ability to identify and apply procedures and processes as appropriate to the situation (B)	☐	Their ability to assess the impact of different approaches and analyse information to support their course of action (AP)	☐
They have a clear plan for dealing with contingencies which could occur during normal / abnormal work situations	☐		
Their ability to take personal responsibility for their own work activities and others under their control (B)	☐		

Practical Observation Checklist
Using the criteria provided for each element of the standard, record performance which has met the required standard by the checking the checkbox.

Provide a brief summary of the factors which influenced your element grade decision of either Fail, Pass or Distinction.

In addition to your own specific questioning of the observed activities, you are required to ask the apprentice a minimum of **ONE** question for each element. Apprentices must demonstrate a suitable level of knowledge in their responses to the selected question/s in order to achieve a minimum of a Pass.

You should provide brief details of the Apprentices responses to the question/s asked. This section can also be used to record these notes and any drawings, calculations, etc completed by the Apprentice to expand on their verbal response

The Assessor **MUST** ask a **minimum** of 1 question Devise some suitable questions which assess the apprentice's knowledge of this element
Responses provided by the apprentice
Fail ☐ **Pass ☐** **Distinction ☐**
Assessor Notes including a brief justification for the element grade awarded

CS1: Applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant & equipment

To achieve a **PASS** the apprentice must achieve **ALL** of the following by providing evidence to demonstrate:	P	To achieve a **DISTINCTION** a minimum of 2 criteria must be achieved by providing evidence which demonstrates:	D
A working knowledge of the relevant Company engineering processes which are applicable to both normal and abnormal work situations / conditions	☐	A detailed technical knowledge and understanding of the relevant Company engineering processes which are applicable to both normal and abnormal work situations / conditions	☐
Their ability to choose and follow the appropriate policy and procedure to achieve the engineering objectives required for the activity (AP)	☐	Their ability to make suggestions for improvement which support / enhance the outcome of the work activity (AP)	☐
Their ability to apply an organised and analytical approach to achieve the engineering objectives required for the activity	☐	Their ability to challenge / question processes which may adversely affect the effectiveness of the work activity	☐
The ability to identify and apply procedures and processes as appropriate to the situation (B)	☐	Their ability to assess the impact of different approaches and analyse information to support their course of action (AP)	☐
They have a clear plan for dealing with contingencies which could occur during normal / abnormal work situations	☐		

CS1: Applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant & equipment

Their ability to take personal responsibility for their own work activities and others under their control (B)	☐		
The Assessor **MUST** ask a **minimum** of 1 question Devise some suitable questions which assess the apprentice's knowledge of this element			
Responses provided by the apprentice			
Fail ☐	**Pass** ☐	**Distinction** ☐	
Assessor Notes including a brief justification for the element grade awarded			

CS2: Demonstrate application of safe working practices in line with company processes and legislative requirements

To achieve a **PASS** the apprentice must achieve **ALL** of the following by providing evidence to demonstrate:	P	To achieve a **DISTINCTION** a minimum of 2 criteria must be achieved by providing evidence which demonstrates:	D
A working knowledge of the relevant Company safe working practices / process's and legislative requirements relevant to their work activity	☐	A detailed knowledge of the relevant Company safe working practices / process's and legislative requirements relevant to their work activity	☐
Their ability to identify and apply the appropriate safety policy and procedure and choose the appropriate course of action depending on the work activity / situation (AP)(B)	☐	Their ability to assess the impact of safety related problems and seek out and solve their root cause/s (AP)	☐
How they have taken personal responsibility for the safety of themselves and others under their control (B)	☐	Their ability to challenge unsafe working practices using appropriate techniques to effectively resolve issues / situations	☐
How they can work safely to achieve required work outcomes within time, cost, quality and budget constraints (B)	☐	Their ability to make suggestions which significantly improve / rectify the safety arrangements / conditions for the work being conducted	☐
How they regularly monitor / check the work activity / environment and take action when necessary to maintain a safe working environment	☐		

CS2: Demonstrate application of safe working practices in line with company processes and legislative requirements

The Assessor **MUST** ask a **minimum** of 1 question Devise some suitable questions which assess the apprentice's knowledge of this element		
Responses provided by the apprentice		
Fail ☐	**Pass** ☐	**Distinction** ☐
Assessor Notes including a brief justification for the element grade awarded		

CS3: Uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service

To achieve a **PASS** the apprentice must achieve **ALL** of the following by providing evidence to demonstrate:	P	To achieve a **DISTINCTION** a minimum of 2 criteria must be achieved by providing evidence which demonstrates:	D
A working knowledge of the relevant test equipment and the test procedures required for the testing operation/s being undertaken	☐	A detailed technical knowledge and understanding of the relevant test equipment and the test procedures required for the work activity	☒
Their ability to follow the appropriate Company testing policy and procedure. and choose the appropriate course of action depending on the situation (AP)	☐	Their ability to take a pro-active lead in accepting additional responsibility / autonomy to improve the work process	☐
Their ability to select and safely use a minimum of **TWO** different types of test equipment on electrical plant / apparatus for the work being undertaken	☐	Their ability to gather and analyse test information to support their course of action and assess the impact in different approaches. (AP)	☐
Their ability to correctly interpret the test results gained from the operations being conducted	☐	Demonstrate their ability to assess the impact of problem situations and solve the root causes of problems (AP)	☐
Their ability to present test information gained in a clear and concise manner to sufficient depth for the audience (AP)	☐		

CS3: Uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service

Their ability to identify and apply testing procedures and processes as in a planned and methodical manner (B) Their ability to take ownership and personal responsibility for the work of themselves and others under their control (B)	☐ ☐		
The Assessor **MUST** ask a **minimum** of 1 question Devise some suitable questions which assess the apprentice's knowledge of this element			
Responses provided by the apprentice			
Fail ☐	**Pass** ☐	**Distinction** ☐	

CS3: Uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service

Assessor Notes including a brief justification for the element grade awarded

CS4: Accurately reads and interprets a wide range of engineering diagrams and drawings

To achieve a **PASS** the apprentice must achieve **ALL** of the following by providing evidence to demonstrate:	P	To achieve a **DISTINCTION** a minimum of 2 criteria must be achieved by providing evidence which demonstrates:	D
A core knowledge of the range of engineering diagrams and drawings available within their Company and their specific use / purpose	☐	A detailed knowledge of the range of engineering diagrams and drawings available within their Company and explain their specific use and purpose	☐
How they have used technical engineering diagrams and drawings to plan and organise their work activity	☐	Their ability to analyse and interpret complex technical information from engineering diagrams and drawings to plan and organise their work activity	☐
Their ability to present technical information in a clear and concise manner to sufficient depth for the audience (AP)	☐	Their ability to transmit difficult technical information to others in an understandable manner (AP)	☐
Their ability to analyse and use engineering diagrams / drawings to methodically apply procedures and processes for their work activity (B)	☐	Their ability to pro-actively identify and solve problems with engineering diagrams / drawings by using a logical and systematic approach	☐
Their ability to communicate information in a confident and effective manner ensuring that all relevant parties understand (B)	☐		
A clear understanding of the Company process for reporting / amending incorrect / inaccurate information identified in engineering diagrams and drawings	☐		

CS4: Accurately reads and interprets a wide range of engineering diagrams and drawings

The Assessor **MUST** ask a **minimum** of 1 question Devise some suitable questions which assess the apprentice's knowledge of this element
Responses provided by the apprentice
Fail ☐ **Pass** ☐ **Distinction** ☐
Assessor Notes including a brief justification for the element grade awarded

CS5: Effectively communicate with others to confirm that the tests meet the required standards/specifications

To achieve a **PASS** the apprentice must achieve **ALL** of the following by providing evidence to demonstrate:	P	To achieve a **DISTINCTION** a minimum of 2 criteria must be achieved by providing evidence which demonstrates:	D
Their ability to identify the relevant internal / external stakeholders and the information they need to be given for confirmation of their testing	☐	Their ability to transmit difficult technical information in an understandable manner (AP)	☐
Their ability to confidently and effectively communicate both verbal and written information ensuring that all relevant parties understand the information given (B)	☐	Their ability to prioritise activities to meet objectives and communicate progress to others (AP)	☐
Their ability to present all information to others in a clear and concise manner and listen and respond to queries / questions (AP)	☐	Their ability to consult and involve the appropriate people to capitalise on different skills, perspectives, experience and knowledge to confirm testing (AP)	☐
Their ability to ensure that recipient/s understand any critical safety / technical information and confirms their understanding where necessary	☐	Their ability through positive relationships to actively address conflict with positive outcomes (AP)	☐
Their ability to take personal responsibility and ownership for confirmation of their testing operations (B)	☐		

CS5: Effectively communicate with others to confirm that the tests meet the required standards/specifications

The Assessor **MUST** ask a **minimum** of 1 question Devise some suitable questions which assess the apprentice's knowledge of this element
Responses provided by the apprentice
Fail ☐ **Pass** ☐ **Distinction** ☐
Assessor Notes including a brief justification for the element grade awarded

SS1: Undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment

To achieve a **PASS** the apprentice must achieve **ALL** of the following by providing evidence to demonstrate:	P	To achieve a **DISTINCTION** a minimum of 2 criteria must be achieved by providing evidence which demonstrates:	D
A core knowledge of the Company testing, commissioning and maintenance procedures relevant to the electrical systems / equipment relevant to their work activity	☐	A detailed technical knowledge of the Company testing, commissioning and maintenance procedures of systems / equipment relevant to their work activity	☐
They have a clear plan of action to undertake their work operations in a logical manner which considers the resources required for the work	☐	Their ability to consult and involve the appropriate people to capitalise on their different skills, perspectives, experience and knowledge (AP)	☐
Their ability to competently follow the appropriate policy / procedure and implement their work plan to achieve their objectives (AP)	☐	Their ability to assess the impact of different approaches and is able to gather and analyse information to support their decisions / course of action (AP)	☐
Their ability to competently deliver their work objectives to meet the agreed deadlines / timescales (AP)	☐	Their ability to seek out and attempt to solve the root causes of problems and make suggestions for improvement (AP)	☐
Their ability to recognise and define potential problems and identifies and solve them in a step by step logical way, where necessary (AP)(B)	☐		

SS1: Undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment

Their ability to take ownership and personal responsibility for the work of themselves and others under their control during the work activity (B)	☐		
The Assessor **MUST** ask a **minimum** of 1 question Devise some suitable questions which assess the apprentice's knowledge of this element			
Responses provided by the apprentice			
Fail ☐	**Pass** ☐	**Distinction** ☐	

SS1: Undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment

Assessor Notes including a brief justification for the element grade awarded

SS2: Undertakes functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system

To achieve a **PASS** the apprentice must achieve **ALL** of the following by providing evidence to demonstrate:	P	To achieve a **DISTINCTION** a minimum of 2 criteria must be achieved by providing evidence which demonstrates:	D
A core knowledge and understanding of the method and purpose of functionality and injection testing on the high voltage equipment being worked on	☐	A detailed technical knowledge and understanding of the range and purpose of functionality and injection testing on the high voltage equipment being worked on	☐
They have a clear plan of action to undertake their testing operations in a logical manner which considers the resources required for the testing operations	☐	Their ability to gather and analyse technical test data to inform their actions or change their approach (AP)	☐
Their ability to inspect and use the test / injection equipment in accordance with the Company polices / manufacturer's instructions	☐	Their ability to communicate / transmit difficult technical information in an understandable manner to relevant persons	☐
Their ability to identify and apply testing / injection procedures in a methodical manner as appropriate to the situation	☐	Their ability to seek out and attempt to solve the root causes of problems and make suggestions for improvement	☐
Their ability to gather and interpret the test / injection results gained to meet the objectives of the testing operation	☐		

SS2: Undertakes functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system

Their ability to record / report the test / injection results gained to meet Company requirements / standards	☐		
The Assessor **MUST** ask a **minimum** of 1 question Devise some suitable questions which assess the apprentice's knowledge of this element			
Responses provided by the apprentice			
Fail ☐	**Pass** ☐	**Distinction** ☐	

SS2: Undertakes functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system

Assessor Notes including a brief justification for the element grade awarded

SS3: Uses appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection which may include older electromechanical relays

To achieve a **PASS** the apprentice must achieve **ALL** of the following by providing evidence to demonstrate:	P	To achieve a **DISTINCTION** a minimum of 2 criteria must be achieved by providing evidence which demonstrates:	D
A core knowledge of the purpose and operation of the microprocessor / numerical based protection being worked on	☐	A detailed technical knowledge of the purpose and operation of microprocessor / numerical based protection being worked on and its effect relevant to the network(AP)	☐
A core knowledge of the relevant test procedures and control settings used to verify the correct operation of the protection equipment being worked on	☐	A detailed technical knowledge and understanding of the relevant test procedures and control settings used to verify the correct operation of the protection equipment being worked on	☐
Their ability to choose and follow the correct methods and procedures to practically achieve the installation / testing of protection equipment (AP)	☐	Their ability to assess the impact of different approaches to the installation / testing operations	☐
Their ability to methodically apply the correct methods and procedures to verify the correct control settings / operation of the protection equipment (B)	☐	Their ability to gather and analyse technical information to support their course of action (AP)	☐

SS3: Uses appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection which may include older electromechanical relays

Their ability to correctly gather and interpret the test results obtained to inform their actions for the protection system being worked on Their ability to communicate progress to others by recording / reporting the outcome of their installation / testing operations in accordance with Company policies and procedures (AP)	☐ ☐		
The Assessor **MUST** ask a **minimum** of 1 question Devise some suitable questions which assess the apprentice's knowledge of this element			
Responses provided by the apprentice			
Fail ☐	**Pass ☐**	**Distinction ☐**	

SS3: Uses appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection which may include older electromechanical relays

Assessor Notes including a brief justification for the element grade awarded

SS4: Ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system

To achieve a **PASS** the apprentice must achieve **ALL** of the following by providing evidence to demonstrate:	P	To achieve a **DISTINCTION** a minimum of 2 criteria must be achieved by providing evidence which demonstrates:	D
A core knowledge of how the protection system being worked on interfaces with the associated high voltage equipment and the wider network	☐	A detailed technical knowledge of how the protection system being wor interfaces with the associated high voltage equipment and the wider ne	☐
A core knowledge of the relevant test procedures and equipment used to verify the correct interface of the protection equipment with the system	☐	Their ability to transmit difficult technical information in an understandable manner (AP)	☐
Their ability to choose and follow the correct methods and procedures to practically achieve the testing / verification of the protection system being worked on (AP)	☐	Their ability to assess the impact of technical interface problems and seek out and attempt to solve the root causes of problems to achieve a solution (AP)	☐
Their ability to methodically apply the correct methods and procedures to verify the correct interface of the protection system being worked on (B)	☐	Their ability to consult with others to capitalise on different skills, perspectives, experience and knowledge to resolve issues (AP)	☐
Their ability to recognise and tackle technical issues in a step by step logical and methodical way and achieve an effective resolution (AP) (B)	☐		

SS4: Ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system

Their ability to communicate progress to others by recording / reporting the outcome of their protection operations in accordance with Company policies and procedures (AP)	☐		
The Assessor **MUST** ask a **minimum** of 1 question Devise some suitable questions which assess the apprentice's knowledge of this element			
Responses provided by the apprentice			
Fail ☐	**Pass** ☐	**Distinction** ☐	

SS4: Ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system

Assessor Notes including a brief justification for the element grade awarded

Appendix G: Practice Technical Interview Template

.Name of Apprentice	
Name of Technical Expert	
Name of Assessor	
Location(s) of Technical Interview	
Date of Technical Interview	
Start Time	
End Time	
Please provide a brief summary of the apprentice's projects discussed during the technical interview	

The EPPPCE Technical Interview checklist and questioning instructions for the technical expert:

Pass criteria

Insert a cross in the checkbox for each PASS criterion that has been met in each element.
Leave the checkbox blank for each criterion failed in each element.
To achieve a PASS in an element, the apprentice must provide sufficient evidence to achieve ALL of the given PASS criteria and give satisfactory responses to a minimum of ONE of the standardised questions provided.
A Fail mark for any of the Pass criteria will result in a provisional Fail grade.
Wherever possible the apprentice should be encouraged to use projects from their worklog to support their explanations.

Distinction criteria

Insert a cross in the checkbox each DISTINCTION criterion that has been met.
To achieve a DISTINCTION in an element the apprentice must first achieve a PASS and demonstrate further sufficient evidence to achieve a minimum of TWO of the given DISTINCTION criteria.

Questioning criteria

The interview should be framed around four topic areas.

1. Undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment
2. Undertakes functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system
3. Uses appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection which may include older electromechanical relays
4. Ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system.

You should ask a minimum of ONE of the standardised questions produced, for each criterion, and ask the question/s in the context of the project being discussed in addition to any of your own specific questioning.

All questions asked should be identified or recorded on the document. You should provide some detail of the context of the question and the response gained from the apprentice.

Finalising the assessment

On completion of the interview and questioning of the apprentice, you should complete the Summary Report table, indicating the final score and the provisional grade awarded for the interview.
You should then provide some comments indicating your reasons for awarding the provisional grade and where possible capture some feedback from the apprentice.

CTK1 A comprehensive understanding of electrical power systems

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A comprehensive knowledge of the relevant Company's electrical power system, network relevant to their work projects and job role	☐	A comprehensive knowledge and detailed understanding of the Company's electrical power network relevant to their work projects and job role and how it influences protection designs	☐
How they have applied their knowledge when planning their protection and commissioning projects ensuring compliance with Company policies	☐	How they have applied their knowledge to make protection, commissioning proposals which have led to improved efficiencies and operations	☐
How they have applied their knowledge to influence, support their decisions during their protection and commissioning projects	☐	How they have used their knowledge to challenge and report identified non-compliance with the relevant Company engineering policies	☐
How they have used their knowledge to make contingency plans for their protection and commissioning projects	☐	How they have conducted analysis of the network design to support their protection and commissioning operations	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	CTK1 A comprehensive understanding of electrical power systems
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CTK2 Detailed understanding of the application/operation of relevant plant & equipment.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the application, operation of the relevant plant and equipment involved in their work projects and job role (AP)	☐	A detailed knowledge and thorough understanding of the application, operation of the relevant plant and equipment involved in their work projects, job role and its interaction with the wider network	☐
How they used their knowledge of the application, operation of plant & equipment to influence the planning of their protection and commissioning projects	☐	How they have applied their knowledge of plant and equipment to make protection, commissioning proposals which have led to improved efficiencies and operations	☐
How they have applied their knowledge to conduct operations on relevant plant and equipment during their protection and commissioning projects	☐	How they have used their knowledge of plant and equipment to challenge and report identified non-compliance with the relevant Company engineering policies	☐
The process they would follow to gain further technical information, specifications about plant and equipment if required	☐	How they have researched the operation of plant, equipment to support their protection and commissioning operations	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	CTK2 Detailed understanding of the application/operation of relevant plant & equipment.
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CTK3 Fault analysis methods in order to interpret results.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the relevant fault analysis methods used in relation to their work projects and job role	☐	A detailed knowledge and thorough technical understanding of the relevant fault analysis methods in relation to their work projects and job role	☐
How they have applied critical thinking to determine which fault analysis method/s to use during their work projects and job role	☐	Their ability to use appropriate engineering theories and principles to justify their fault analysis approach to achieve successful outcomes (AP)	☐
They have taken ownership of their fault analysis work, and where relevant those affected by the work (AP)	☐	Their ability to compare and analyse the differing fault analysis methods to ensure the optimum method is chosen	☐
How they have taken a systematic and logical approach to apply a range of fault analysis procedures to solve problems during their work projects and job role (B)	☐	How they have used their knowledge of fault analysis to identify issues and influence operational changes which have led to an improved performance	☐
How they interpreted the results of their fault analysis to identify and implement solutions to resolve engineering problems	☐		

<table>
<tr><td>The Technical Expert MUST ask a minimum of ONE question for this related element</td><td>CTK3 Fault analysis methods in order to interpret results.</td></tr>
<tr><td>Questions:

Develop some open ended questions</td><td rowspan="3">Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:</td></tr>
<tr><td>Responses provided by the apprentice:</td></tr>
<tr><td>Additional questioning, if required:</td></tr>
<tr><td colspan="2">Fail ☐ Pass ☐ Distinction ☐</td></tr>
</table>

CTK4 How high voltage power generation, transmission and distribution plant & equipment operates.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the Company's electrical network layout, configuration relevant to their work projects and job role (AP)	☐	A detailed knowledge and thorough understanding of the Company's electrical network design and operating parameters	☐
A detailed knowledge of the Company's high voltage plant and equipment and how it operates relevant to their work projects and job role (AP)	☐	How they have applied their knowledge of plant and equipment to make protection, commissioning proposals which have led to improved efficiencies and operations	☐
How they used their knowledge of the plant & equipment to influence the planning of their protection and commissioning projects	☐	How they have used their knowledge of plant and equipment to challenge and report identified non-compliance with the relevant Company engineering policies	☐
How they have applied their knowledge to conduct operations on relevant plant and equipment during their protection and commissioning projects	☐	How they have researched the operation of plant and equipment to support their protection and commissioning operations	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CTK4** How high voltage power generation, transmission and distribution plant & equipment operates.
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CTK5 Understands protection, control and telemetry equipment and the impact on the electrical network of its operation

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the protection and control equipment used on the network which are relevant to their work projects and job role (AP)	☐	A detailed knowledge and thorough technical understanding of the protection and control equipment used on the network which are relevant to their work projects and job role	☐
A detailed knowledge of the telemetry equipment used on the network which is applicable to their work projects and job role and the impact of its use on the network (AP)	☐	A detailed knowledge and thorough technical understanding of the telemetry equipment used on the network which is relevant to their work projects and job role	☐
How they have used their knowledge to influence, support the planning of their protection and commissioning work projects	☐	How they have used appropriate engineering theories and principles to make suggestions, proposals which have led to an improved system and network performance (AP)	☐
How they have used their knowledge to influence their decisions when conducting their protection and commissioning work	☐	How they have used their knowledge to appropriately challenge and report identified non-compliance with the relevant Company engineering policies	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CTK5** Understands protection, control and telemetry equipment and the impact on the electrical network of its operation
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CTK6 Understands commissioning and testing procedures & processes

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the relevant Company commissioning and testing procedures and processes which are relevant to their work projects and job role	☐	A detailed knowledge and thorough technical understanding of the relevant Company commissioning procedures and processes which are relevant to their work projects and job role	☐
How they have used their knowledge of the relevant Company commissioning and testing processes, procedures to plan and conduct their work projects and job role	☐	A detailed knowledge and thorough technical understanding of the relevant Company testing procedures and processes which are relevant to their work projects and job role	☐
How they have applied their knowledge to influence, support their decisions during their commissioning and testing operations	☐	How they have used their knowledge of relevant commissioning and testing procedures to make suggestions which have influenced or led to an improved performance	☐
How they have used their knowledge to identify and resolve problems during their commissioning and testing operations (B)	☐	How they have used their knowledge to appropriately to challenge and report identified non-compliance with the relevant Company engineering policies	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CTK6** Understands commissioning and testing procedures & processes
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CTK7 Understands failure mode(s) of plant and equipment and the impact on the electrical network and the knowledge to identify required remedial actions.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the symptoms, causes of plant and equipment failure which is relevant to their work projects and job role (AP)	☐	A detailed knowledge and thorough technical understanding of the symptoms, causes of plant and equipment failure which is relevant to their work projects and job role	☐
A detailed knowledge of the potential impact on the wider network of plant, equipment failure which is relevant to their work projects and job role (AP)	☐	A detailed knowledge and thorough technical understanding of the potential impact of plant and equipment failure which is relevant to their work projects and job role	☐
How they have used their knowledge of plant and equipment failure to support their protection, commissioning decisions in their work projects and job role	☐	How they have analysed plant, equipment failure to implement remedial action/s in their work projects and job role	☐
How they have used their knowledge of plant and equipment failure to implement remedial action/s in their work projects and job role	☐	How they have applied the correct engineering theories and principles to take remedial actions which have achieved successful outcomes (AP)	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CTK7** Understands failure mode(s) of plant and equipment and the impact on the electrical network and the knowledge to identify required remedial actions
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CTK8 Understands high voltage electrical network operations and topologies.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the relevant Company high voltage electrical network operations and procedures relevant to their work projects and job role	☐	A detailed technical knowledge of the relevant Company high voltage electrical network operations and procedures relevant to their work projects and job role	☐
A detailed knowledge of the roles and responsibilities of the persons involved in high voltage electrical network operations	☐	How they have applied their knowledge of network operations to make proposals which have led to improved operational efficiencies and performance	☐
A detailed knowledge of the relevant Company high voltage topologies (network symbols and layout) used during their work projects	☐	How they have applied their knowledge of network topologies (network layout) to make proposals which have led to improved operational efficiencies and performance	☐
How they have used their knowledge of high voltage electrical network operation, topologies to plan and conduct their work projects	☐	How they have conducted analysis of the network design to identify issues and solve problems which have to led to improved network efficiencies	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CTK8** Understands high voltage electrical network operations and topologies
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CTK9 Understands high voltage safe systems of work and risk management

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the relevant Company safe systems of work and risk management procedures relevant to their work projects and job role	☐	A detailed knowledge and thorough understanding of the relevant Company safe systems of work and risk management procedures relevant to their work projects and job role	☐
A detailed knowledge of the roles and responsibilities of the persons involved in implementing and maintaining safe systems of work relevant to their work projects and job role	☐	How they have applied their knowledge of safe systems of work to make proposals which have led to improved safety performance	☐
A detailed knowledge of the Company processes and procedures for identifying and managing risk relevant to their work projects and job role	☐	How they have applied their knowledge of risk management to make proposals which have led to improved safety performance	☐
How they have used their knowledge of safe systems of work and risk management procedures to plan and conduct their work projects	☐	They used their knowledge of safe systems of work and risk management procedures to challenge unsafe behaviour and practices using appropriate techniques	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CTK9** Understands high voltage safe systems of work and risk management
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CTK10 Understands the application of Electricity Supply Standards, regulations and policies.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the Company's regulatory obligations and how they influence their own work projects and job role	☐	A detailed and thorough knowledge of the business's regulatory obligations and the impact they have on the Company's strategic planning	☐
A detailed knowledge of the Electricity Supply Regulations and how they have applied them when planning, conducting their work projects and job role	☐	A detailed and thorough knowledge of the Electricity Supply Regulations and the impact they have on the Company's strategic planning	☐
A detailed knowledge of the Company policies which are relevant to their work projects, job role and how they have applied them when planning and conducting their work	☐	How have used their knowledge to propose, implement solutions which have led to an improved regulatory performance	☐
How they have used their knowledge of the regulatory requirements when planning and conducting their work projects	☐	How they have gathered and analysed relevant information in order to identify, implement workable solutions to support and meet regulatory requirements	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CTK10** Understands the application of Electricity Supply Standards, regulations and policies
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CTK11 Understands test equipment to select appropriate equipment for commissioning.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the relevant test equipment and procedures required for commissioning	☐	A detailed knowledge and technical understanding of the relevant test equipment and the test procedures required for their work projects and job role	☐
A detailed knowledge of the test results, parameters for commissioning plant, systems relevant to their work projects and job role	☐	A detailed knowledge and technical understanding of the relevant test results and parameters and the causes / implications of not achieving the expected results	☐
How they have conducted testing procedures and processes relevant to their work projects and job role in a logical and methodical manner (B)	☐	How they have used appropriate engineering theories and principles to analyse test results to gain a deeper understanding of the equipment and system being commissioned (AP) (B)	☐
Their ability to correctly interpret and record, present the test results gained in a clear and concise manner from the testing conducted	☐	How they have used the results gained to identify and solve technical issues which has led to a successful outcome	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CTK11** Understands test equipment to select appropriate equipment for commissioning.
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CS1 Applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant & equipment.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the relevant Company engineering and analytical processes during both normal and abnormal conditions on high voltage plant & equipment	☐	Their ability to take the lead and organise and control engineering operations on high voltage plant, equipment during both normal and abnormal work situations	☐
Their ability to apply the relevant Company engineering operations on high voltage plant, equipment during both normal and abnormal work situations and conditions (AP)	☐	Their ability to make suggestions for improvement which support, enhance the outcome of the work activity (AP)	☐
Their ability to apply the relevant Company analytical processes when conducting work on high voltage plant. equipment in a logical and methodical manner (B)	☐	Their ability to accurately and confidentially describe the rational for their operations and can justify the actions they have taken (AP)	☐
How they have developed clear plans for dealing with contingencies which may occur during normal and abnormal work situations	☐	Their ability to use the appropriate engineering theories and principles to technically explain the operations undertaken (AP)	☐
How they have used a systematic and logical approach to pro-actively solve problems during	☐		

normal and or abnormal work situations and conditions (B)	

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CS1** Applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant & equipment
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CS2 Demonstrate application of safe working practices in line with company processes and legislative requirements.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the relevant Company safe working practices, process's and legislative requirements relevant to their work projects and job role	☐	A detailed knowledge and through understanding of the relevant Company safe working practices, process's and legislative requirements relevant to their work activity	☐
Their ability to plan and organise the relevant Company safe working practices, process's and legislative requirements relevant to their work project and job role	☐	Their ability to assess the impact of safety related problems and seek out and solve their root cause(s)	☐
Their ability to take ownership of the operations and apply the relevant Company safe working practices and process's using a logical and systematic approach (AP)(B)	☐	Their ability to challenge unsafe working practices using appropriate techniques to effectively resolve issues and situations	☐
How they have taken personal responsibility for the safety of themselves and others under their control or affected by their operations	☐	Their ability to make suggestions which significantly improve, rectify the safety arrangements and conditions for the work being conducted	☐
How they have monitored and maintained a safe working environment and taken action where	☐		

necessary to maintain this condition	

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CS2** Demonstrate application of safe working practices in line with company processes and legislative requirements
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CS3 Uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the relevant Company high voltage test equipment and the procedure(s) for use, relevant to their work projects and job role	☐	A detailed technical knowledge and understanding of the relevant test equipment and the test procedures required for their work projects and job role	☐
Their ability to use different types of test equipment to confirm the suitability of high voltage plant, equipment for conformity and suitability for operational service	☐	Their ability to gather and analyse test information to support their course of action and assess the impact in different approaches.	☐
Their ability to take ownership of the operations and apply testing procedures and processes in a planned and methodical manner (AP)(B)	☐	Their ability to use the appropriate engineering theories and principles to technically explain the testing operations undertaken (AP)	☐
Their ability to correctly interpret the test results gained from their testing operations and present, record the test information gained in a clear and concise manner	☐	Their ability to assess the impact of problem situations and pro-actively identify and solve problems (B)	☐
Their ability to use test information to make informed	☐		

decisions and solve problems by using a logical and systematic approach (B)	

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CS3** Uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

CS4 Prepares and checks technical reports.

To achieve a PASS the apprentice must achieve ALL of the following criteria during their interview by providing evidence which demonstrates:	P	To achieve a DISTINCTION a minimum of 2 distinction criteria must be achieved during the interview process which demonstrates:	D
A detailed knowledge of the Company reporting methods and processes relevant to their work projects and job role	☐	Their ability to analyse and interpret complex technical information from engineering diagrams, specifications and use it to produce clear and accurate reports	☐
Their ability to produce and check technical reports in a methodical manner to record and inform the business of their work projects (B)	☐	Their ability to communicate complex technical information contained in their reports in a clear and understandable manner	☐
Their ability to present technical information from their reports in a clear and effective manner to sufficient depth for the audience	☐	Their ability to pro-actively identify and solve problems with engineering diagrams, drawings by using a logical and systematic approach	☐
A clear understanding of the Company process for reporting, amending incorrect and inaccurate technical information identified during their work activities	☐	Their ability to accurately capture in their reports their actions on plant and equipment and justify the actions / and approach taken	☐

The Technical Expert MUST ask a minimum of **ONE** question for this related element	**CS4** Prepares and checks technical reports.
Questions: *Develop some open ended questions*	**Provide comments explaining the reasons for awarding a Fail, Pass or Distinction grade awarded for this technical interview:**
Responses provided by the apprentice:	
Additional questioning, if required:	
Fail ☐	**Pass** ☐ **Distinction** ☐

Technical Interview Assessment Checklist and Summary Record	Pass – Check each box achieved	Distinction - Check each box achieved
Core Technical Knowledge		
CTK1 A comprehensive understanding of electrical power systems	6☐	
CTK2 Detailed understanding of the application/operation of relevant plant and equipment	1☐	
CTK3 Fault analysis methods in order to interpret results	2☐	1☐
CTK4 How high voltage power generation, transmission and distribution plant and equipment operates	1☐	
CTK5 Understands protection, control and telemetry equipment and the impact on the electrical network of its operation	2☐	2☐
CTK6 Understands commissioning and testing procedures and processes	2☐	1☐
CTK7 Understands failure mode(s) of plant and equipment and the impact on the electrical network and the knowledge to identify required remedial actions	2☐	1☐
CTK8 Understands high voltage electrical network operations and topologies	1☐	
CTK9 Understands high voltage safe systems of work and risk management	1☐	
CTK10 Understands the application of Electricity Supply Standards, regulations and policies	1☐	

Technical Interview Assessment Checklist and Summary Record	Pass – Check each box achieved	Distinction - Check each box achieved
CTK11 Understands test equipment to select appropriate equipment for commissioning	1☐	1☐
Core Skills		
CS1 Applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant and equipment	6☐	3☐
CS2 Demonstrate application of safe working practices in line with company processes and legislative requirements	5☐	2☐
CS3 Uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service	6☐	3☐
CS4 Prepares and checks technical reports	5☐	
Specific Plant Skill		
SS1 Undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment	8☐	4☐
Specific Protection Skill		

Technical Interview Assessment Checklist and Summary Record	Pass – Check each box achieved	Distinction - Check each box achieved
SS2 Undertakes functionality testing and the injection of currents and voltages into high voltage equipment and their associated protection and control systems to simulate the range of fault conditions and scenarios that can occur on the electrical system	8☐	4☐
SS3 Uses appropriate test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection which may include older electromechanical relays.	8☐	4☐
SS4 Ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system	8☐	4☐
Total Pass and Distinction marks achieved		
Combined total marks achieved		

Note: Pass marks **must be a minimum of 70** before any distinction marks can be awarded

Total points

Fail	Pass	Distinction
0-69	70-84	85-100
☐	☐	☐

Apprentice Comments

Technical Experts Comments and Justification of Grade Awarded

By signing below I confirm that the information provided is correct and the preliminary grade awarded is a true reflection of the performance by the apprentice

Technical Expert Name / Signature	Date