L3 EPA Electrical Power Protection and Plant Commissioning Engineer

EPA Specification Section 5.3 – The Practical Observation

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Introduction

Following the completion of the Knowledge Assessment and the Technical Interview and within the final 6 months of their apprenticeship, each apprentice will be assessed by a technical expert completing a practical activity in a working environment. The duration will typically be 1 day. The actual time will be based on the comparable time a competent worker in the industry would take to achieve successful task(s) completion.

The Practical Observation for the role of an EPPPC Engineer will involve each apprentice being observed carrying out a range of activities which typically include the installation, testing and commissioning of protection systems to prove the integrity of power system plant and equipment.

Assessment Requirements

Each observation will provide the opportunity for the apprentice to synoptically demonstrate their core skills, knowledge and behaviours. These typically will include:

- testing, commissioning and maintenance activities on a range of electrical power systems and equipment which may include transformers, switchgear, conductors, battery systems and ancillary equipment
- undertake protection testing, commissioning and maintenance activities involving 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
- the use of appropriate range of test equipment to verify protection and control settings and ensure correct installation and operation of modern microprocessor and numerical based protection as well as older electromechanical relays
- taking appropriate actions to ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system.

Each apprentice will be assessed on EACH of the specific skill requirements shown overleaf.

Table 3

KSB	Available points	
	Pass	Distinction*
Core Skills	**70 points awarded if all Pass criteria are achieved**	
CS1 applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant & equipment		2
CS2 demonstrate application of safe working practices in line with company processes and legislative requirements		2
CS3 uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service		2
CS4 accurately reads and interprets a wide range of engineering diagrams and drawings		2
CS6 effectively communicate with others to confirm that the tests meet the required standards/specifications		2
Skill-specific activities		
PL1 undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment		5
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		5
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		5
PR3 ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system		5
Behaviours**		
B1 team working: safely working as a member of a team to achieve required outcomes within time, cost, quality and budget constraints		
B2 interpersonal skills: able to relate to people at all levels and take others' views into account to ensure the best possible outcome		
B3 communication: confident and effective communicator both verbally and in writing ensuring that all parties understand		
B4 problem solving: pro-actively identifies and solves problems, within personal area of expertise, by using a logical and systematic approach		
B5 methodical: identifies and applies procedures and processes as appropriate to the situation		
B6 ownership: takes personal responsibility for the work of themselves and others under their control		

*The maximum Distinction marks indicated are awarded for achievement of a skill. If the skill is not achieved at Distinction level, 0 marks are awarded for the Distinction criterion

**The Core Behaviours listed above are a component part of the EPPPCE Standard and a crucial factor when assessing competent performance. To avoid the necessity of assessing each behaviour in isolation EUIAS have integrated each behaviour into the relevant skill element of the Practical Observation assessment criteria. This means that each behaviour will be assessed within the context of the appropriate skill element, providing a more holistic and effective assessment approach.

During the practical observation process each apprentice will be observed by a technical expert undertaking practical activities in a working environment. EUIAS will appoint a technical expert who, due to the specialised nature of the work, may be from within the apprentice's own organisation or someone known to the apprentice. The technical expert conducting the assessment may be required to personally supervise the apprentice, for example when working on live equipment. Therefore, the technical expert will hold the appropriate safety rule authorisation to undertake the activities being undertaken and will be authorised by the organisation that owns the premises where the observation is being conducted.

The apprentice will be asked questions to confirm their understanding of the rationale for actions taken and the choices made to complete the tasks. The technical expert may, if required, ask follow-up questions to probe for further clarification as necessary.

The technical expert for the observation will present the observation outcomes to the final decision panel. The final decision panel will assign the mark for the practical observation. A maximum of 100 marks are available to contribute towards the overall grade.

Grading the Practical Observation

The apprentice can achieve a Pass, Distinction or Fail.

There will be a maximum of 100 marks available for the Practical Observation.

The decision to recommend an element Fail will result where an apprentice fails to meet any one or more of the elements Pass criteria. This may occur for any element criteria where the apprentice demonstrates a series of minor poor performance issues or alternatively where the apprentice infringes any critical safety issues such as any deviation from the company safety rules or operational procedures. In cases where the apprentice makes an error that is likely to cause harm to themselves or others or where serious damage is likely to be caused the technical expert will intervene immediately to stop the action and the assessment will be terminated.

A Pass grade will be recommended in cases where the apprentice demonstrates competence for all the criteria listed in Table 3.

The addition of Distinction points can only be recommended against elements where a Pass has already been achieved. A Distinction grading will be recommended in cases where the minimum Distinction mark of 85 is reached.

Marks will be awarded using the scores indicated in Table 3 above.

Overall scores and grades are awarded as follows:

Fail	Pass	Distinction
0-69 marks	**70-84 marks**	**85-100 marks**

Indicative Grading Criteria

The following criteria are indicative of the criteria the assessor will be looking for when the apprentice carries out the Practical Observation.

Standard	Indicative Pass Criteria	Indicative Distinction Criteria
Core Skill Activities		
S1 applies appropriate engineering and analytical processes to both normal and abnormal conditions on high voltage power generation, transmission or distribution plant and equipment	*All the pass criteria must be achieved by providing evidence which demonstrates:* A working knowledge of the relevant Company engineering processes which are applicable to both normal and abnormal work situations / conditions Ability to choose and follow the appropriate policy and procedure to achieve the engineering objectives required for the activity Ability to apply an organised and analytical approach to achieve the engineering objectives required for the activity Ability to identify and apply procedures and processes as appropriate to the situation A clear plan for dealing with contingencies which could occur during normal / abnormal work situations Ability to take personal responsibility for their own work activities and others under their control	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed technical** knowledge and **understanding** of the relevant Company engineering processes which are applicable to both normal and abnormal work situations / conditions Ability to make **suggestions for improvement** which support / enhance the outcome of the work activity Ability to **challenge / question processes** which may adversely affect the effectiveness of the work activity Ability to **assess the impact of different approaches** and **analyse information** to support their course of action

Standard	Indicative Pass Criteria	Indicative Distinction Criteria
S2 demonstrate application of safe working practices in line with company processes and legislative requirements	*All the pass criteria must be achieved by providing evidence which demonstrates:* A working knowledge of the relevant Company safe working practices / process's and legislative requirements relevant to their work activity Ability to identify and apply the appropriate safety policy and procedure and choose the appropriate course of action depending on the work activity / situation How they have taken personal responsibility for the safety of themselves and others under their control How they can work safely to achieve required work outcomes within time, cost, quality and budget constraints How they regularly monitor / check the work activity / environment and take action when necessary to maintain a safe working environment	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed** knowledge of the relevant Company safe working practices / process's and legislative requirements relevant to their work activity Ability to **assess the impact of** safety related problems and **seek out and solve** their root cause/s Ability to **challenge** unsafe working practices using appropriate techniques to effectively resolve issues / situations Ability to make **suggestions** which **significantly improve** / rectify the safety arrangements / conditions for the work being conducted
S3 uses a range of appropriate test equipment to confirm the suitability of the high voltage plant for conformity and operational service	*All the pass criteria must be achieved by providing evidence which demonstrates:* A working knowledge of the relevant test equipment and the test procedures required for the testing operation/s being undertaken Ability to follow the appropriate Company testing policy and procedure. and choose the appropriate course of action depending on the situation	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed technical** knowledge and **understanding** of the relevant test equipment and the test procedures required for the work activity Ability to take a **pro-active lead** in accepting **additional responsibility / autonomy** to improve the work process

Standard	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to select and safely use a minimum of **TWO** different types of test equipment on electrical plant / apparatus for the work being undertaken Ability to correctly interpret the test results gained from the operations being conducted Ability to present test information gained in a clear and concise manner to sufficient depth for the audience Ability to identify and apply testing procedures and processes as in a planned and methodical manner Ability to take ownership and personal responsibility for the work of themselves and others under their control	Ability to **gather and analyse test information** to support their course of action and **assess the impact** in different approaches Ability to **assess the impact of** problem situations and **solve the root causes** of problems
S4 accurately reads and interprets a wide range of engineering diagrams and drawings	*All the pass criteria must be achieved by providing evidence which demonstrates:* A core knowledge of the range of engineering diagrams and drawings available within their Company and their specific use / purpose How they have used technical engineering diagrams and drawings to plan and organise their work activity Ability to present technical information in a clear and concise manner to sufficient depth for the audience	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed** knowledge of the range of engineering diagrams and drawings available within their Company and explain their specific use and purpose Ability to analyse and **interpret complex** technical information from engineering diagrams and drawings to plan and organise their work activity Ability to transmit **difficult technical** information to others in an understandable manner

Standard	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to analyse and use engineering diagrams / drawings to methodically apply procedures and processes for their work activity Ability to communicate information in a confident and effective manner ensuring that all relevant parties understand A clear understanding of the Company process for reporting / amending incorrect / inaccurate information identified in engineering diagrams and drawings	Ability to **pro-actively** identify and **solve problems** with engineering diagrams / drawings by using a logical and systematic approach
S6 effectively communicate with others to confirm that the tests meet the required standards/specifications	*All the pass criteria must be achieved by providing evidence which demonstrates:* Ability to identify the relevant internal / external stakeholders and the information they need to be given for confirmation of their testing Ability to confidently and effectively communicate both verbal and written information ensuring that all relevant parties understand the information given Ability to present all information to others in a clear and concise manner and listen and respond to queries / questions Ability to ensure that recipient/s understand any critical safety / technical information and confirms their understanding where necessary	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* Ability to transmit **difficult technical** information in an understandable manner Ability to **prioritise activities** to meet objectives and communicate progress to others Ability to **consult and involve** the appropriate people to **capitalise on different skills, perspectives, experience and knowledge** to confirm testing Ability through positive relationships to actively **address conflict** with positive outcomes

Standard	Indicative Pass Criteria	Indicative Distinction Criteria
	Ability to take personal responsibility and ownership for confirmation of their testing operations	
Skill-Specific Activities		
PL1 undertake testing, commissioning and maintenance activities on electrical power systems and equipment. This could include transformers, switchgear, conductors, battery systems and ancillary equipment	*All the pass criteria must be achieved by providing evidence which demonstrates:* A core knowledge of the company testing, commissioning and maintenance procedures relevant to the electrical systems / equipment relevant to their work activity A clear plan of action to undertake their work operations in a logical manner which considers the resources required for the work Ability to competently follow the appropriate policy / procedure and implement their work plan to achieve their objectives Ability to competently deliver their work objectives to meet the agreed deadlines / timescales Ability to recognise and define potential problems and identifies and solve them in a step by step logical way, where necessary Ability to take ownership and personal responsibility for the work of themselves and others under their control during the work activity	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed technical** knowledge of the Company testing, commissioning and maintenance procedures of systems / equipment relevant to their work activity Ability to **consult and involve** the appropriate people to **capitalise on different skills, perspectives, experience and knowledge** to confirm testing Ability to **assess the impact o**f different approaches and is able to **gather and analyse** information to support their decisions / course of action Ability to seek out and attempt to solve the root causes of problems and **make suggestions for improvement**

Standard	Indicative Pass Criteria	Indicative Distinction Criteria
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	*All the pass criteria must be achieved by providing evidence which demonstrates:* A core knowledge and understanding of the method and purpose of functionality and injection testing on the high voltage equipment being worked on A clear plan of action to undertake their testing operations in a logical manner which considers the resources required for the testing operations Ability to inspect and use the test / injection equipment in accordance with the Company polices / manufacturer's instructions Ability to identify and apply testing / injection procedures in a methodical manner as appropriate to the situation Ability to gather and interpret the test / injection results gained to meet the objectives of the testing operation Ability to record / report the test / injection results gained to meet Company requirements / standards	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed technical** knowledge and understanding of the range and purpose of functionality and injection testing on the high voltage equipment being worked on Ability to **gather and analyse** technical test data to **inform their actions** or change their approach Ability to communicate / transmit **difficult** technical information in an understandable manner to relevant persons Ability to seek out and attempt to solve the root causes of problems and **make suggestions for improvement**
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	*All the pass criteria must be achieved by providing evidence which demonstrates:* A core knowledge of the purpose and operation of the microprocessor / numerical based protection being worked on	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed technical** knowledge of the purpose and operation of microprocessor / numerical based protection being worked on and its effect relevant to the network

Standard	Indicative Pass Criteria	Indicative Distinction Criteria
	A core knowledge of the relevant test procedures and control settings used to verify the correct operation of the protection equipment being worked on Ability to choose and follow the correct methods and procedures to practically achieve the installation / testing of protection equipment Ability to methodically apply the correct methods and procedures to verify the correct control settings / operation of the protection equipment Ability to correctly gather and interpret the test results obtained to inform their actions for the protection system being worked on Ability to communicate progress to others by recording / reporting the outcome of their installation / testing operations in accordance with Company policies and procedures	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 Ability to **assess the impact of different approaches** to the installation / testing operations Ability to **gather and analyse** technical information to support their course of action
PR3 ensure that protection systems interface correctly with the associated high voltage equipment and, where necessary, coordinates effectively with the wider high voltage system	*All the pass criteria must be achieved by providing evidence which demonstrates:* A core knowledge of how the protection system being worked on interfaces with the associated high voltage equipment and the wider network A core knowledge of the relevant test procedures and equipment used to verify the correct interface of the protection equipment with the system Ability to choose and follow the correct methods and procedures to practically achieve the testing /	*A minimum of 2 criteria must be achieved by providing evidence which demonstrates:* A **detailed technical** knowledge of how the protection system being worked on interfaces with the associated high voltage equipment and the wider network Ability to transmit **difficult technical** information in an understandable manner

Standard	Indicative Pass Criteria	Indicative Distinction Criteria
	verification of the protection system being worked on Ability to methodically apply the correct methods and procedures to verify the correct interface of the protection system being worked on Ability to recognise and tackle technical issues in a step by step logical and methodical way and achieve an effective resolution Ability to communicate progress to others by recording / reporting the outcome of their protection operations in accordance with Company policies and procedures	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 Ability to **consult** with others to **capitalise on different skills, perspectives, experience and knowledge to resolve issues**