



Australian Government

Assessment Requirements for UETTD RIS71 Diagnose and rectify faults in electrical energy supply transmission systems

Release: 1

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Modification History

Release 1. This is the first release of this unit of competency in the UET Transmission, Distribution and Rail Sector Training Package.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least two separate occasions and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including the use of risk control measures
- applying sustainable energy principles and practices
- diagnosing and rectifying faults in electrical energy supply transmission systems, including:
 - applying logical diagnostic methods
 - using fault scenarios to test the source of system faults
 - identifying faults and competency needed to rectify them
 - rectifying faults in system
 - verifying that the system operates correctly
 - documenting fault rectification
 - dealing with unplanned events on at least one occasion.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- overview of the transmission system encompassing:
 - lines, buses, transformers and cables; line/bus layouts, including single and double switching, breaker and a half systems and high voltage (HV) crossing methods
- the principles involved in HV alternating current (a.c.) transmission encompassing:
 - tower types and configurations; choice of towers or poles (economic and environmental); insulator types and configuration; types of conductors, their configuration and standard nomenclature; typical line spacing and ground clearances; line ratings based on ambient

- temperature; conductor terminating and clamping equipment, including vibration damping principles and equipment
- principles involved in direct current (d.c.) transmission encompassing:
 - the economics, harmonic generation, VAR requirements and protection difficulties; types of connections and transformer requirements; advantages and disadvantages of d.c. transmission; typical overseas systems and likely (future) use in Australia
- the principles of operation, voltage and current range, breaking capacity and field of use of the following types of circuit breakers
 - bulk oil
 - small oil volume
 - air break
 - air blast
 - air puffer
 - vacuum and
 - SF6 (double pressure and puffer types)
- the types of isolators in use, such as duo-roll, blade and scissor type
- circuit breaker auxiliary systems encompassing:
 - high pressure air systems, and air storage and handling processes
 - d.c. systems, including battery types, charging and protection systems and earth fault detection systems
 - SF6 conditioning, storage and handling system
- the characteristics of lines and cables encompassing:
 - the calculation of R, X and B for different arrangements of conductor; typical values for actual lines; transposition; models based on line length; voltage and line regulation; the transmission of power (P) and VARs (Q)
- control of voltage - conditions leading to voltage collapse and system disintegration, effects on the system of high voltage (HV)/low voltage (LV), and voltage control devices including:
 - voltage regulators applied to generators and synchronous phase modifiers
 - electromagnetic voltage regulators
 - series and parallel capacitors
 - on-load tap changer (OLTC) transformers and static VAR compensations (SVCs)
- range of devices covered by SVCs, including:
 - saturated reactor (SR) compensations
 - thyristor controlled reactor (TCR) compensators
 - combined TCR/TSCs
 - production of wave-form distorting harmonics and control devices
- importance of the location in the system of voltage control devices
- use of graphical methods to calculate the size of VAR regulating plant
- types of communication systems including:
 - telephone, power line carrier, dedicated cable, micro-wave links and fibre optics; quantities and signals to be communicated; Advantages and disadvantages of the various

systems and equipment requirements

- transient over-voltages in power systems, including:
 - switching and lightning over-voltages and their effect on different plant items; transient over-voltage control and reduction using surge diverters, shield wires and CB control; insulation systems, insulation coordination, insulation grading in plant items, and bushings and capacitor bushings
- factors leading to the generation of corona encompassing:
 - consequences of corona; reduction of corona, including conductor bundling, grading rings and conductor surface treatment.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated conditions involving realistic and authentic activities that replicate operational workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, facilities, equipment and personal protective equipment (PPE) currently used in industry
- applicable documentation, including workplace procedures, relevant industry standards, equipment specifications, regulations, codes of practice and operation manuals.

Links

UET Training Package Companion Volume Implementation Guide is found in VETNet - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=229bace1-b7bc-4653-9300-dffb13ecfad7>