



Australian Government

Assessment Requirements for UETDRSO011 Respond to discrete and interdependent protection operations

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 Release 2.0.

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
- developing and evaluating, on at least three (3) occasions:
 - identifying discrete/interdependent relay operations by interpreting available alarms and event data
 - analysing and diagnosing system failures
 - evaluating responses to discrete/interdependent relay operations
- describing control and alarms associated with discrete/interdependent protection systems
- dealing with unplanned events on at least one (1) occasion.

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:

- transmission, distribution and rail systems encompassing:
 - relationship between the transmission, distribution and rail/tram system within an overall power system - different organisations responsible for generation, transmission, distribution and rail/tram; how they correlate and their functions
 - characteristics of a transmission, distribution and rail system - principal components; typical voltage levels and methods of transmission and distribution, including grid type transmission systems, radial, parallel and ring main feeders
 - relationship between an overhead and underground supply systems within an overall power system - advantages/disadvantages, applications and the basic steps for planning and installing an overhead and underground distribution system
 - single line drawings and layouts - drawings and layouts of transmission and distribution systems, including radial, parallel and ring main feeders and the high voltage (HV) equipment associated with substations

- substations and power transformers encompassing:
 - relationship between the substations within an overall power system - purpose, location in relation to load centres, layout of HV equipment within the substation and auxiliary equipment
 - characteristics of a power transformer - basic construction of distribution transformers; operation under load/no-load conditions; types and basic operation of tap changing switches, including solid state types; and efficiency and cooling
 - auxiliary equipment used on transformers - function and basic operation
 - maintenance of a power transformer - basic connections, restrictions to parallel operation, problems and remedies associated with harmonics, and testing and fault-finding procedures
 - characteristics of a reactors - description and purpose
- HV fault switching principles encompassing:
 - primary causes, effects and types of HV electrical faults
 - HV protection devices - main components, types, categories, applications and functions
 - basic principle of operation of HV system protection devices
 - protection coordination and protection zoning
 - HV feeder auto-reclosing suppression encompassing – function and application
 - circuit condition requirements and switching considerations when paralleling and separating HV feeders
- detailed operation and setting of discrete protection systems encompassing:
 - earth fault protection - master earth leakage schemes, sensitive earth fault relays and schemes, residual earth fault scheme, core balance earth fault scheme, frame/structure earth leakage scheme, time graded discrimination and backup protection
 - overcurrent protection - feeder overcurrent protection, instantaneous overcurrent schemes, inverse timed overcurrent schemes, types and location of components of an overcurrent scheme, CT summation, time graded discrimination and backup protection
 - alarms and controls - auxiliary relays, voltage regulating relays, line drop compensation, gas relay types, gas relay scheme operation and setting, and over temperature schemes
- detailed operation of interdependent protection systems encompassing:
 - overcurrent and earth leakage schemes, including intertripping, interlocking and blocking - logic mapping, master control, electromechanical, electronic and shading coils
 - pilot wire and phase comparison - opposed voltage schemes, circulating current schemes, location of components of a scheme and pilot supervisory techniques
 - load shedding, voltage control, parallel operation and load rejection
 - busbar protection and circuit breaker failure protection
 - reclose systems - applications, single shot, multi-shot, blocking schemes and synchronisation checking.

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, personal protective equipment (PPE), relevant modelling tools, and computerised electrical plant control and monitoring facilities currently used in industry
- applicable documentation, including workplace procedures, relevant industry standards, equipment specifications, drawings, regulations, codes of practice and operation manuals.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=229bace1-b7bc-4653-9300-dffb13ecfad7>