



Australian Government

UETTDRSO50 Respond to complex power system protection operations

Release: 2

UETTDRSO50 Respond to complex power system protection operations

Modification History

Release 2. Removed deleted units UETTDRSO34 and UETTDRSO42 from Pre-requisite Unit pathways due to zero enrolments.

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

Application

This unit covers the coordination of response to complex protection operations due to system faults. It includes planning, carrying out and completing the response to complex protection operations.

The application of the skills and knowledge described in this unit may require a licence/registration to practice in the workplace subject to regulations for undertaking of electrical work.

Other conditions may apply under state and territory legislative and regulatory licencing requirements which must be confirmed prior to commencing this unit.

Pre-requisite Unit

All competencies in the Common Unit Group must have been completed, plus all competencies in one (1) of the identified Pathway Unit Group(s).

Common Unit Group

UEENEED104A Use engineering applications software on personal computers

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, assemble and dismantle utilities industry components

UEENEEE104A Solve problems in d.c. circuits

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEE124A Compile and produce an energy sector detailed report

UEENEEE125A Provide engineering solutions for problems in complex multiple path circuits

UEENEEE126A Provide solutions to basic engineering computational problems

UEENEEG101A Solve problems in electromagnetic devices and related circuits

UEENEEG102A Solve problems in low voltage a.c. circuits

UEENEEG149A Provide engineering solutions to problems in complex polyphase power circuits

UETTDREL11 Apply sustainable energy and environmental procedures

UETTDREL16 Working safely near live electrical apparatus

UETTDRI62 Implement and monitor the power system organisational WHS/OHS policies, procedures and programs

UETTDRI63 Implement & monitor power system environmental & sustainable energy management policies & procedures

UETTDRSO41 Manage power systems transmission networks

UETTDRSO48 Respond to discrete and interdependent protection operations

UETTDRSO49 Coordinate power system operations in a regulated energy market

Generation/Distribution and Sub-transmission Pathway Unit Group

UETTDRSO37 Develop high voltage distribution and sub-transmission switching programs

UETTDRSO40 Coordinate high voltage distribution and sub-transmission networks

Generation/Transmission Pathway Unit Group

UETTDRSO38 Develop and evaluate power systems transmission switching programs

UETTDRSO47 Coordinate high voltage transmission network

Distribution and Sub-transmission Pathway Unit Group

UETTDRSO35 Manage high voltage distribution and sub-transmission network demand

UETTDRSO37 Develop high voltage distribution and sub-transmission switching programs

UETTDRSO40 Coordinate high voltage distribution and sub-transmission networks

Transmission Pathway Unit Group

UETTDRSO38 Develop and evaluate power systems transmission switching programs

UETTDRSO41 Manage power systems transmission networks

UETTDRSO47 Coordinate high voltage transmission network

Competency Field

System Operations

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

PERFORMANCE CRITERIA

Elements describe the essential Performance criteria describe the performance needed to

outcomes.

demonstrate achievement of the element.

1 Plan response to complex protection operations

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) practices/procedures and environmental and sustainable energy procedures, which may influence the preparation of response to complex protection operations, are reviewed and determined
- 1.2** Purpose of the response is established after data is analysed and expected outcomes of the work are confirmed with appropriate personnel
- 1.3** Established policies, procedures and specifications for the response are obtained or established with appropriate personnel
- 1.4** Response to complex protection operations are discussed with and/or directed to appropriate personnel in order to ascertain the scope of the work/testing required
- 1.5** Testing parameters are ascertained from established policies, procedures and specifications
- 1.6** Equipment/tools and personal protective equipment (PPE) are selected based on specified performance criteria and established procedures
- 1.7** Work roles and tasks are allocated according to requirements and individual competencies
- 1.8** Work is prioritised and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe, to a quality standard and in accordance with established procedures
- 1.9** Liaison and communication issues with others/authorised personnel, authorities and clients are resolved and activities coordinated to carry out work
- 1.10** Risk control measures are identified, prioritised and evaluated against the work schedule
- 1.11** Need for relevant work permits is identified to coordinate the performance of work according to requirements and/or established procedures
- 1.12** Circuit/systems modelling is used to evaluate alternative proposals in accordance with established procedures

2 Carry out response to complex protection operations

- 2.1** Strategic plans are developed incorporating organisational initiatives as per established procedures
- 2.2** WHS/OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures
- 2.3** Decisions concerning the response to complex protection operations are made on the basis of safety and effective outcomes according to requirements and/or established procedures
- 2.4** Stakeholders/customers are kept informed of current status regarding plan progress and recent developments
- 2.5** Technical advice is given regarding potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures
- 2.6** Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the work within an agreed timeframe according to requirements
- 2.7** Testing of the decision to be implemented is undertaken according to requirements and established procedures
- 2.8** Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures
- 2.9** Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements
- 2.10** Quality of work is monitored against personal performance agreement and/or established organisational and professional standards

3 Complete the response to complex protection operations

- 3.1** Final review of the response to complex protection operation is undertaken to ensure it complies with all requirements and includes all specifications and documentations needed to complete the work

- 3.2 Appropriate personnel are notified of completion and reports and/or completion documents (electronic/paper) are finalised/commissioned
- 3.3 Reports and/or completion documents (electronic/paper) are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
- 3.4 Approved copies of the response to complex protection operation documents (electronic/paper) are issued and records are updated in accordance with established procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UETTDRSO50A Respond to complex power system protection operations.

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>

Assessment Requirements for UETTDRSO50 Respond to complex power system protection operations

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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, all of the following:
 - identifying complex relay operations by interpreting available alarms and event data
 - analysing and diagnosing system failures
 - evaluating response to complex relay operations
- describing the following:
 - describing control and alarms associated with complex 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:

- protection system types encompassing:
 - requirements of a protection scheme - relationship to primary system design, purpose of protection, safety of persons, protection of plant, system instability, system break up, loss of customers, loss of revenue, protection zones, restricted schemes, unrestricted schemes, duplicate protection, local backup protection, remote backup protection, selectivity, discrimination, stability, sensitivity and reliability
 - components of a protection scheme - current transformers, potential transformers, summation current transformers, interposing transformers, multi-tapped transformers, all-or-nothing relays, induction relays, balanced beam relays, directional relays, biased relays, solid state relays, microprocessor based relays, gas relays, thermal sensors, hardwired communication, powerline carriers systems, microwave systems, fibre optic

- systems, need for isolation and need for interfacing
- protection applied to buses - overload, differential, earth leakage, structure leakage, combined schemes and protection overlap
- protection applied to transformers - biased differential, gas, winding temperature and oil temperature
- protection applied to single/radial lines - overcurrent, earth leakage, slow earth leakage, distance, auto-reclose, sectionalising and over voltage
- protection applied to interconnected lines - overcurrent, pilot wire, directional, directional overcurrent, current differential, phase comparison, current comparison, distance, impedance, admittance and offset
- use of fault information to analyse and develop optimal network restoration strategies encompassing:
 - Commonwealth/state/territory and local government legislation, supply authority regulations, standards, codes and/or enterprise requirements applicable to the analysis of protection targeting
 - requirements for the use of operational manuals, system diagrams/plans and drawings
 - techniques in the collation of protection data
 - techniques in the analyse and assessment of fault information – public, employee and protection equipment
 - application methods of fault information to analyse and develop optimal network restoration strategies - public and employee safety, and enterprise reliability guidelines
 - resource availability.

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

Links

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