



Australian Government

UETDRSO002 Coordinate high voltage transmission network

Release: 1

UETDRSO002 Coordinate high voltage transmission network

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.

Application

This unit covers the monitoring of high voltage (HV) transmission networks in real time. This includes power quality, alarm interpretation, facilitating and monitoring the status of access authorities and ensuring that the network is operated within design parameters at all times. It also includes dispatching and coordination of field repair crews to respond to and rectify abnormalities and liaise with other electrical authorities.

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 licensing requirements which must be confirmed prior to commencing this unit.

Pre-requisite Unit

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

UETDREL001 Apply environmental requirements

UETDREL005 Work safely in the vicinity of live electrical apparatus

UETDRIS005 Implement & monitor power system environmental & sustainable energy management policies & procedures

UETDRIS006 Implement and monitor the power system organisational WHS/OHS policies, procedures and programs

UETDRSO004 Develop and evaluate power systems transmission switching programs

Competency Field

System Operations

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Plan for the coordination of HV transmission networks

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- 1.1** Work health and safety (WHS)/occupational health and safety (OHS) practices/procedures and environmental and sustainable energy procedures, which may influence the coordination of HV transmission networks, are reviewed and determined
- 1.2** Purpose of the coordination of the network is established after data is analysed and expected outcomes of the work are confirmed with appropriate personnel
- 1.3** Organisational established procedures on policies and specifications for the coordination of the network are obtained or established with appropriate personnel
- 1.4** Testing procedures are discussed with/directed to appropriate personnel in order to ascertain the project brief
- 1.5** Testing parameters are established from organisational established procedures and policies and specifications

- 1.6 Work roles and tasks are allocated according to requirements and individual competencies
 - 1.7 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
 - 1.8 Liaison and communication issues with other authorised personnel, authorities, clients and landowners are resolved and activities coordinated to carry out work
 - 1.9 Risk control measures are identified, prioritised and evaluated against the work schedule
 - 1.10 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
- 2 **Carry out the coordination of HV transmission networks**
 - 2.1 Circuit/systems modelling is used to evaluate alternative proposals in accordance with 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 Coordination decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
 - 2.4 Mathematical and/or engineering models of the coordination process are used to analyse the effectiveness of the finished project in accordance with requirements and established procedures
 - 2.5 Technical advice is given regarding potential hazards, safety risks and control measures so that monitoring and preventative actions 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 project within an agreed timeframe according to requirements
 - 2.7** Testing of coordination process 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
 - 2.11** Strategic plans are developed incorporating organisation initiatives in accordance with established procedures
- 3 Complete the coordination of HV transmission networks**
- 3.1** Final review of the coordination processes is undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project
 - 3.2** Appropriate personnel are notified of completion and reports and/or completion documents are finalised/commissioned
 - 3.3** Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval
 - 3.4** Approved copies of coordination documents 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 UET Transmission, Distribution and Rail Sector Training Package Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UETTDRSO47 Coordinate high voltage transmission network.

Links

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

Assessment Requirements for UETDRSO002 Coordinate high voltage transmission network

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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
- demonstrating on at least three (3) occasions the coordination of system manipulations that encompass:
 - high voltage (HV) sub-transmission and distribution network
 - HV sub-transmission and distribution network manipulation to control loading on equipment
 - transformers with HV windings (if applicable to enterprise equipment)
 - HV busbars
 - HV isolators
 - HV switchgear (applicable to enterprise equipment)
- coordinating a HV transmission network, including all of the following:
 - writing switching instructions
 - checking switching instructions
 - coordinating switching instructions
 - calculating plant loading
 - preparing and authorising HV sub-transmission and distribution switching programs
 - monitoring switching progress
 - monitoring the status of access permits/authorities on HV network equipment
 - ensuring network plant operates within design and regulatory requirements on a real time basis
 - dispatching and communicating with field crews to respond/rectify system abnormalities
 - applying and administering of supervisory control and data acquisition (SCADA) (if applicable to enterprise equipment)
 - analysing and diagnosing system failures
 - calculating and analysing paralleling conditions on the interconnected HV system
- allowing safe network access for maintenance activities, including monitoring and managing

switching, to:

- manage load
- manage voltage
- minimise loss
- maximise system reliability
- allow safe network access for maintenance activities
- allow safe network access for construction activities
- validating fault reports arising from system disturbances
- 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:

- 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
- coordinating and directing switching instructions encompassing:
 - legislation, standards, codes, supply authority regulations and/or enterprise requirements applicable to switching sheet instructions
 - specific enterprise processes, policies and procedures to be followed
 - processes of consultation, negotiation and coordination - clear and concise instructions and information, methods for the encouragement of feedback and contributions of information and ideas, and responsibilities of members of the team
 - techniques in analysing, planning, coordinating and organising work for a safe outcome according to statutory requirements and regulations
 - techniques in the effective utilisation of available resources
 - techniques in the coordination and directing of switching schedules instructions
 - relationship between the operating authorities and HV customers, and operating agreements
 - techniques in coordinating and directing HV and low voltage (LV) switching of electrical networks
 - requirements for the use of manuals, system diagrams/plans and drawings - types, characteristics and capabilities of LV and HV electrical equipment to be switched
 - responsibilities of the switching operator
 - techniques in writing switching instructions - sequence of switching operations, isolation

- procedures, earthing procedures and switching completion notification procedures
- techniques in gathering, collating and confirming data on switching procedures
- alternating current (a.c.) transmission system components encompassing:
 - support structures and reasons for selection
 - insulators and reasons for selection
 - conductors and reasons for selection
 - vibration management systems and principles
 - line ratings based on voltage, span, tension and temperature
- a.c. transmission line models encompassing:
 - types of transmission line models based on line length
 - calculation of voltage drop, line regulation and transmission efficiency
 - load sharing between lines
- basic design features and characteristics of transmission structures and associated equipment and/or components encompassing:
 - standards, codes, legislation, supply authority regulations and/or enterprise requirements applicable to installing of poles/structures and associated equipment and or components
 - transmission systems principles – terminologies, primary and secondary, voltage levels and types of lines
 - characteristics of structure - types of structure (towers and poles, concrete and steel), characteristics of types of structures, installation methods and maintenance techniques
 - characteristics of associated equipment used on structures – insulators and earthing (overhead earth and communication lines).

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, 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, network drawings, operational event

data and operation manuals.

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