



Australian Government

UETTDRDS46 Develop planned power systems outage strategies

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.

Application

This unit covers the competency required to assess and manage the impact on the network and customers with regards to planned outages. This includes customer outage times, network and plant loading issues and regulatory requirements. A detailed knowledge of network performance indicators is required.

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

Common Unit Group

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

UEENED104A Use engineering applications software on personal computers

UETTDRREL16 Working safely near live electrical apparatus

UETTDRIS62 Implement and monitor the power system organisational WHS/OHS policies, procedures and programs

Competency Field

Design

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Plan for and coordinate the development of outage strategies

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 outage strategies, are reviewed and determined
- 1.2** Purpose of the outage is established and expected outcomes of the work are confirmed with appropriate personnel
- 1.3** Organisational established procedures on policies and specifications for the outage are obtained or established with appropriate personnel
- 1.4** Equipment/tools and personnel protective equipment (PPE) are selected and coordinated based on specified requirements and established procedures
- 1.5** Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures
- 1.6** Risk control measures are identified, prioritised and evaluated against the work schedule
- 1.7** Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures
- 1.8** Resources, including personnel, equipment, tools and PPE, required for the job are identified, scheduled and coordinated and confirmed safe and in technical working order
- 1.9** Liaison and communication issues with others/authorised personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work
- 1.10** Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised,

- where applicable, in accordance with established procedures
- 2 Carry out and coordinate the development of outage strategies**
- 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 incidence of accidents and minimise waste are incorporated into the strategy in accordance with requirements and/or established procedures
- 2.3** Strategy decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures
- 2.4** Mathematical models of the outage strategies are used to analyse the effectiveness of the finished project in accordance with requirements and established procedures
- 2.5** Technical advice is given to 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 strategy within an agreed timeframe according to requirements
- 2.7** Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
- 2.8** Quality of work is monitored against personal performance agreement and/or established organisational and professional standards
- 3 Complete and coordinate the development of outage strategies**
- 3.1** Final review of the strategy is undertaken to ensure it complies 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

- 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 outage strategy 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 Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UETTD RDS46A Develop planned power systems outage strategies.

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 UETTDRDS46 Develop planned power systems outage strategies

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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
- writing three (3) outage strategies, including at least one (1) of each of the following network types:
 - low voltage (LV) networks
 - high voltage (HV) networks
- each of the above outage strategies must include the following:
 - switching instructions laid out according to enterprise requirements
 - a documented process to indicate methods used to check switching instructions
 - documentation of coordination process of switching schedules
 - documentation of plant loading calculation
 - initiation of customer notifications according to enterprise requirements
 - entry of data for collection of 'minute of supply' records into relevant 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:

- working safely on or around electrical equipment through the application of risk management principles and control measures for dealing with non-electrical hazards and extra-low voltage (ELV), LV and HV hazards and high current hazards encompassing:
 - risk management and assessment of risk:
 - principle and purpose of risk management and processes for conducting a risk assessment
 - hazards associated with LV, ELV and high currents
 - arrangement of power distribution and circuits in an electrical installation

- parts of an electrical system and equipment that operate at LV and ELV
- parts of an electrical system and equipment where high currents are likely
- risks and control measures associated with HV:
 - parts of an electrical system and equipment that operate at HV
 - the terms ‘touch voltage’, ‘step voltage’, ‘induced voltage’ and ‘creepage’ as they relate to the hazards of HV
 - control measures used for dealing with the hazards of HV
- optical fibre safety:
 - coherent optical sources and joining procedures and laser safety class 3a devices or their replacement
- risks and control measures associated with LV:
 - risks associated with modifying electrical installations, fault finding, maintenance and repair
 - control measures before, during and after working on electrical installations, circuits or equipment
 - isolation and tagging-off procedures
 - risks and restrictions in live work and control measures for live work
- risks and control measures associated with harmful dusts and airborne contaminants:
 - thermal insulation, fibrous cement materials and asbestos and other fibre reinforced switchboard materials
- safety, selection, use, maintenance and care of test equipment:
 - safety characteristics of electrical testing devices
 - safe use of electrical testing device
 - checks and storage methods for maintaining the safety of testing devices
- WHS/OHS enterprise responsibilities encompassing:
 - provisions of relevant WHS/OHS legislation
 - principles and practice of effective WHS/OHS management
 - management arrangements relating to regulatory compliance
 - enterprise hazards and risks, control measures and relevant expertise required
 - characteristics and composition of workforce and their impact on WHS/OHS management
 - relevance of enterprise management systems to WHS/OHS management
 - analysis of working environment and design of appropriate WHS/OHS management systems
 - analysis of relevant data and evaluation of WHS/OHS system effectiveness
 - assess resources to establish and maintain WHS/OHS management systems
- coordinating access authority procedures encompassing:
 - specific enterprise processes, policies and procedures to be followed
 - processes of consultation, negotiation and co-ordination:
 - clear and concise instructions and information
 - methods for the encouragement of feedback and contributions of information and

- ideas
 - responsibilities of members of the team
 - techniques in analysing, planning, coordination and organising work for a safe outcome and according to statutory requirements and regulations
 - techniques in the effective utilisation of available resources
 - techniques in the development of an access authority/permit and/or access authority/permit issuing procedures
 - techniques in facilitating and coordinating the delivery and issuing of access authorities
 - techniques in gathering, collating and confirming data on different worksites:
 - electrical network diagrams for the specific worksite
 - earth access authorities
 - safe working area
 - work to be carried out in confined space or in hazardous environment
 - specific outsourcing procedures
 - specific hazard identification, risk classification and management procedures
 - regulatory requirements, such as WHS/OHS and electrical safety
 - techniques in the receiving and coordinating the cancellation of access authorities in readiness for restoration
 - methods of conducting audits on correct access authority procedures
 - process of issuing of other access authorities for work permits:
 - working in confined space, if required
 - coordination of access authorities
 - engaging and briefing contractors on electrical and other work
 - issue and receipt of operating agreements
- principles of safe design encompassing:
 - Commonwealth/state/territory legislation, standards, codes, supply authority regulations and/or enterprise requirements associated with safe design principles
 - particular reference to state and territory regulations regarding working near energised conductors, electrical access, heights, confined space, testing procedures and licensing rules
 - application of safe design principles:
 - safe design duty related information, safe design process related information and safe design evaluations
- installation of switchgear and associated equipment encompassing:
 - types and function of various switchgear:
 - isolators, air-break switches, gas-filled switches, vacuum type, links, fuses, oil disconnectors, fuse switches and circuit breakers
 - operating characteristics
 - advantages and disadvantages of different types switchgear
 - installation procedures
 - earthing requirements and techniques

- types of equipment:
 - transformers, reactors, regulators, capacitors, relays, surge arrestors, fault indicators and mobile generators
- installation procedures for switchgear and equipment:
 - standards, codes, legislation, supply authority regulations and/or enterprise requirements
 - assembly and erecting procedures
 - earthing requirements and techniques and pole mounted locations
- maintenance procedures for switchgear and equipment:
 - diagnosing and rectifying faults according to electricity supply industry (ESI) standards and procedures
- testing and commissioning:
 - ESI standards and procedures
- LV switching principles encompassing:
 - standards, codes, legislation, supply authority regulations and/or enterprise requirements applicable to switching of LV to a given schedule
 - requirements for the use of manuals, system diagrams/plans and drawings:
 - types, characteristics and capabilities of electrical apparatus
 - use, characteristics and capabilities of specialised tools and testing equipment
 - LV network interconnectors source of possible back-feed
 - LV switching techniques:
 - identifying hazards, assessing and controlling risks associated with LV switching operations, electrical access permit(s), operational procedures, earthing procedures and personnel protective equipment (PPE) for LV switching
- HV switching principles encompassing:
 - standards, codes, legislation, supply authority regulations and/or enterprise requirements applicable to switching of HV to a given schedule
 - requirements for the use of manuals, system diagrams/plans and drawings:
 - types, characteristics and capabilities of electrical apparatus
 - use, characteristics and capabilities of specialised tools and testing equipment
 - HV network interconnectors source of possible back-feed
 - role of the HV switching operator
 - operational forms, access authorities and permits associated with HV switching:
 - types of operational forms, access authorities and permits
 - purpose and procedure for operational forms, access authorities and permits
 - use and operation of equipment associated with HV overhead and substation equipment:
 - test instruments, sticks, interrupters and arc strangles
 - types and categories of HV switchgear
 - application, function and operating capabilities of switchgear
 - restrictions pertaining to HV switching equipment
 - procedures for the isolation of HV transmission main and working earths

- earthing HV electrical apparatus practices and procedures for access:
 - purposes of operational and additional work part 'on-site' earths
 - factors determining the location and effectiveness of operational earthing
 - acceptable industry procedures and personal protective equipment (PPE)
- HV switching techniques
- operating switching apparatus:
 - identifying hazards, assessing and controlling risks associated with HV switchgear operation, systematic and defensive techniques, mobile radio procedures and double isolation procedures
- HV overhead and substation switching principles encompassing:
 - legislation, standards, codes, legislation, supply authority regulations and/or enterprise requirements applicable to HV overhead and substation switching
 - requirements for the use of manuals, system diagrams/plans and drawings:
 - types, characteristics and capabilities of HV electrical equipment to be switched
 - use and characteristics and capabilities of specialised tools and testing equipment
 - role and responsibilities of the HV switching operator
 - operational forms, access authorities and permits hazard/risk assessments associated with HV switching:
 - types of operational forms, access authorities and permits
 - hazard/risk assessments and purpose and procedure for operational forms, access authorities and hazard/risk assessments
 - use and operation of equipment associated with HV overhead and substation equipment:
 - test instruments, sticks, interrupters and arc strangles
 - HV switchgear:
 - types, categories, application and operating capabilities
 - operation of HV overhead switching or indicating devices:
 - fuses; disconnect fuses
 - load switching
 - live line indicators
 - capacitors
 - reclosers
 - sectionalisers
 - underslung links
 - airbreaks
 - switches
 - disconnects
 - live line clamps
 - phasing sticks
 - phasing tester
 - operation of protection systems and substation equipment:

- fault levels and settings
- types and applications
- protection systems and substation equipment fault levels and settings
- types and applications
- restrictions pertaining to HV switching equipment
- procedures for the isolation of HV mains and working earths:
 - earthing HV electrical apparatus practices and procedures for access authority issuing
 - HV switching techniques
- operate switching apparatus:
 - identifying hazards, assessing and controlling risks associated with HV switchgear operation
 - systematic and defensive techniques
 - mobile radio procedures
 - double isolation procedures.

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 PPE currently used in industry to develop planned outage strategies
- applicable documentation, including workplace procedures, relevant industry standards, equipment specifications, regulations, codes of practice and operation manuals.

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