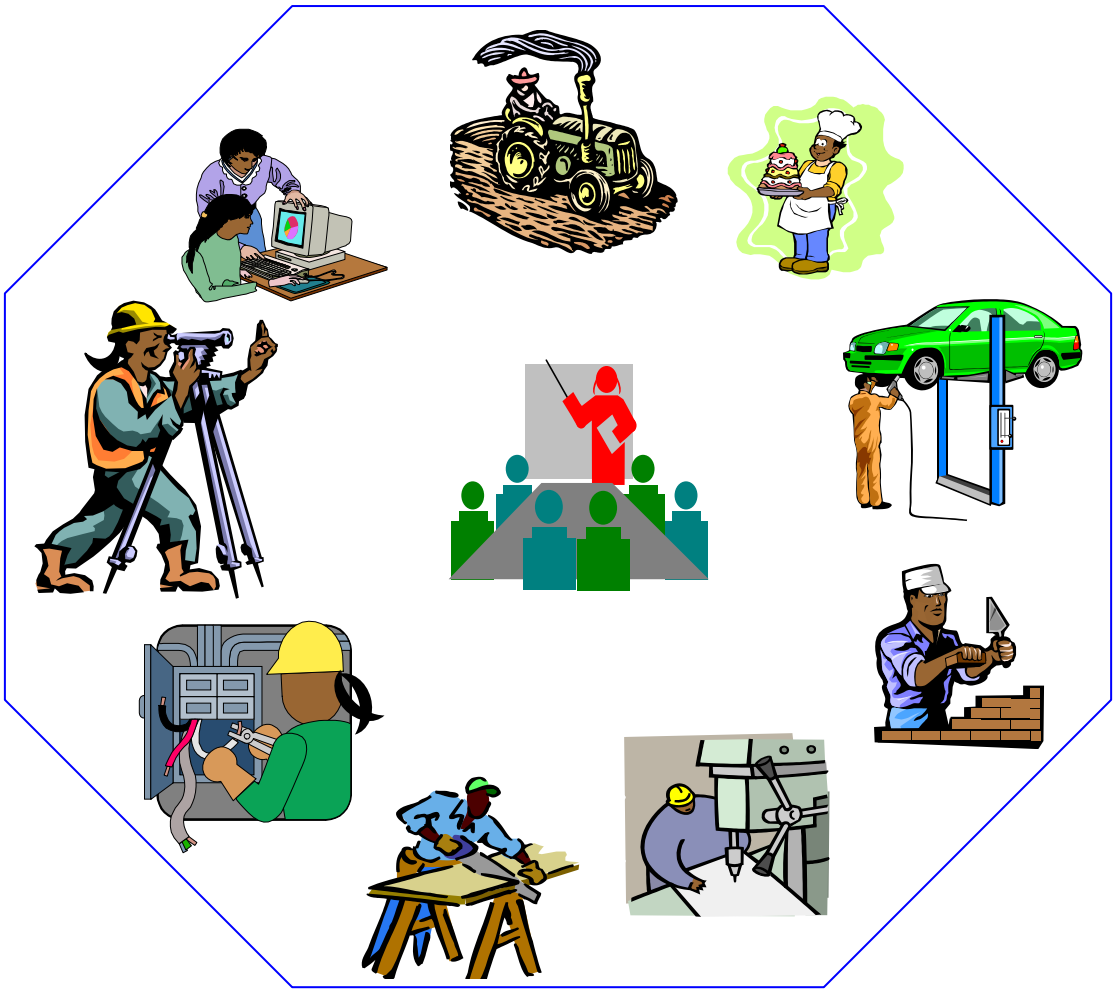
Federal Democratic Republic of Ethiopia

OCCUPATIONAL STANDARD

# POWER TRANSMISSION, DISTRIBUTION, INSPECTION AND MAINTENANCE

## NTQF Level II



*Ministry of Education*

*June 2012*

# Introduction

Ethiopia has embarked on a process of reforming its TVET-System. Within the policies and strategies of the Ethiopian Government, technology transformation – by using international standards and international best practices as the basis, and, adopting, adapting and verifying them in the Ethiopian context – is a pivotal element. TVET is given an important role with regard to technology transfer. The new paradigm in the outcome-based TVET system is the orientation at the current and anticipated future demand of the economy and the labor market.

The Ethiopia Occupational Standards (EOS) is the core element of the Ethiopian National TVET-Strategy and an important factor within the context of the National TVET-Qualification Framework (NTQF). They are national Ethiopian standards, which define the occupational requirements and expected outcome related to a specific occupation without taking TVET delivery into account.

This document details the mandatory format, sequencing, wording and layout for the Ethiopia Occupational Standard which comprised of Units of Competence.

A Unit of Competence describes a distinct work activity. It is documented in a standard format that comprises:

- Occupational title and NTQF level
- Unit title
- Unit code
- Unit descriptor
- Elements and Performance criteria
- Variables and Range statement
- Evidence guide

Together all the parts of a Unit of Competence guide the assessor in determining whether the candidate is competent.

The ensuing sections of this EOS document comprise a description of the occupation with all the key components of a Unit of Competence:

- chart with an overview of all Units of Competence for the respective level (Unit of Competence Chart) including the Unit Codes and the Unit Titles
- contents of each Unit of Competence (competence standard)
- occupational map providing the technical and vocational education and training (TVET) providers with information and important requirements to consider when designing training programs for this standards and for the individual, a career path

## UNIT OF COMPETENCE CHART

**Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance**

**Occupational Code: EIS TDM**

***NTQF Level II***

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| EIS TDM2 01 0612<br>Apply Environment and Sustainable Energy Procedures | EIS TDM2 02 0612<br>Lay Electrical Cables | EIS TDM2 03 0612<br>Installl and Maintain De-Energized LV Underground Polymeric Cables |
| EIS TDM2 04 0612<br>Operate Plant and Equipment near Live Electrical Conductors/ Apparatus | EIS TDM2 05 0612<br>Fix and Secure Equipment | EIS TDM2 06 0612<br>Lay Wiring and Terminate Accessories for Extra-Low Voltage Circuits |
| EIS TDM2 07 0612<br>Solve Problems in Single and Three Phase Low Voltage Circuits | EIS TDM2 08 0612<br>Install and Maintain Poles / Structures and Associated Hardware | EIS TDM2 09 0612<br>Install and Maintain Overhead Conductors and Cables (Poles and Structures) |
| EIS TDM2 10 0612<br>Erect and Maintain Transmission Towers and Associated Hardware | EIS TDM2 11 0612<br>Install and Maintain De-Energized LV Underground Paper Insulated Cables | EIS TDM2 12 0612<br>Joint and Maintain Energized LV Underground Polymeric Cables |
| EIS TDM2 13 0612<br>Perform LV Field Switching Operation to a Given Schedule | EIS TDM2 14 0612<br>Install and Maintain Public Lighting Systems | EIS TDM2 15 0612<br>Install and Maintain Low Voltage Services (Underground) |
| EIS TDM2 16 0612<br>Install and Maintain Low Voltage Services (Overhead) | EIS TDM2 17 0612<br>Install, Replace and Inspect Single and 3 Phase Energy Meters and Associated | EIS TDM2 18 0612<br>Install and Maintain Overhead Conductors and Cables (Towers) |
| EIS TDM2 19 0612<br>Inspect Overhead Structures and Electrical Apparatus (Towers) | EIS TDM2 20 0612<br>Inspect Overhead Structures and Electrical Apparatus (Poles and Structures) | EIS TDM2 21 0612<br>Maintain Overhead Energized LV Conductors and Cables |

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| EIS TDM2 22 0612<br>Work in Team Environment | EIS TDM2 23 0612<br>Participate in Workplace Communication | EIS TDM2 24 0612<br>Develop Business Practice |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
|---|---|
| **Unit Title** | **Apply Environment and Sustainable Energy Procedures** |
| **Unit Code** | **EIS TDM2 01 0612** |
| **Unit Descriptor** | This unit covers the implementation of relevant environmental procedures to specific projects/sites. It includes the identification of possible environmental risks and impacts, the undertaking of work in accordance with sustainable energy and energy conservation principles, the provision of re-cycling materials and the recording and reporting of environmental incidents. It also encompasses the process of reviewing and participating and contributing in environmental procedures according to established enterprise requirements. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare to implement environmental and sustainable energy procedures | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the implementation of environmental and sustainable energy procedures are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Environmental and sustainable energy procedures are identified, prioritized and combined within relevant projects, following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to environmental and sustainable energy procedures, requirements and/or established procedures.<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are |

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| | | obtained and confirmed in working order. |
| | 1.8 | Relevant personnel at worksite are confirmed current in environmental and sustainable energy procedures and other related work procedures according to requirements. |
| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.10 | Site is prepared according to the work schedule, taking into account environmental and sustainable energy procedures and the need to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed on environmental and sustainable energy procedures and respective responsibilities confirmed where applicable in accordance with established procedures. |
| 2. Carry out environmental and sustainable energy procedures | 2.1 | OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Use of power tools/equipment, techniques and practices are safely followed under environmental and sustainable energy procedures and, currency according to requirements confirmed. |
| | 2.3 | Essential knowledge and associated skills are applied in the safe implementation of environmental and sustainable energy procedures to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
| | 2.4 | Relevant environmental procedures are applied to a ***specific project(s)/site(s).*** |
| | 2.5 | Work is conducted in accordance with the principles of sustainable energy and energy conservation. |
| | 2.6 | Provision for the re-cycling or re-use of materials is undertaken where possible. |
| | 2.7 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.8 | Unplanned events in the implementation of environmental and sustainable energy procedures are |

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| | | undertaken within the scope of established procedures. |
| | 2.9 | Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills on environmental and sustainable energy procedures. |
| | 2.10 | On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the environmental and sustainable energy procedures | 3.1 | Work undertaken is checked against works schedule for conformance with requirements and environmental and sustainable energy procedures and, anomalies reported in accordance with established procedures. |
| | 3.2 | Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable. |
| | 3.3 | Work site is rehabilitated, cleaned up and made safe in accordance with environmental and sustainable energy procedures as well as other established procedures. |
| | 3.4 | Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with environmental and sustainable energy procedures as well as other established procedures. |
| | 3.5 | Relevant work permit(s) are signed off and, ***environmental risks***/***incidents*** and potential impacts are reported and recorded according to requirements/established procedures. |
| | 3.6 | Works completion records, reports, as installed /modified drawing and/or ***documentation*** and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| Specific project(s)/site(s) | May include but is not limited to:<br>• buildings<br>• plants construction and maintenance sites<br>• workshops and laboratories<br>• catchments<br>• flood plains irrigation sites<br>• wetlands<br>• drainage sites<br>• waste disposal sites<br>• easements |

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| Environmental risks | May include:<br>• impact of mismanagement of chemicals<br>• impact of mismanagement of biological agents<br>• detrimental impact on limited water resources<br>• spillage; waste disposal<br>• detrimental impact on water catchment areas (urban and non-urban)<br>• detrimental impact on rivers<br>• waterways and channels<br>• unsatisfactory trade waste treatment and disposal processes<br>• poor construction processes<br>• planning deficiencies<br>• neglect of sustainable energy principles |
| Environmental legislation | May include:<br>• relevant federal legislation<br>• relevant State/Territory legislation<br>• relevant local government by-laws<br>• relevant government or quasi government policies and regulations<br>• relevant community planning and<br>• development agreements (e.g. land care agreements) |
| Incidents of environmental impact | May include:<br>• emissions to air<br>• releases to/of water<br>• releases to land<br>• vibration and noise<br>• disposal of waste<br>• contamination of land<br>• impact on communities<br>• destruction of habitat<br>• use of energy sources<br>• waste generation processes and technologies<br>• impact on culturally significant sites and<br>• may involve the implementation of emergency responses |
| Environmental management documentation: | • May include:<br>• information on applicable environmental laws or other requirements<br>• complaint records<br>• training records<br>• process information<br>• process operational log books<br>• inspection, maintenance and calibration records<br>• relevant contractor and supplier information<br>• incident reports<br>• information on emergency preparedness and response |

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| | • records of significant environmental impacts<br>• chain of custody and compliance records<br>• audit results<br>• management reviews |
| The following constants and variables included in this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance systems |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Occupational health and safety principles<br>• Environmental Fundamentals |

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| | • Material handling and the environment<br>• Filtering and sampling oil and the environment<br>• Enterprise specific - OHS instructions |
| Underpinning Skills | Demonstrates skills to:<br>• Occupational health and safety practices<br>• Filtering and sampling oil and the environment<br>• Enterprise specific - OHS instructions |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Lay Electrical Cables** |
| **Unit Code** | **EIS TDM2 02 0612** |
| **Unit Descriptor** | This unit covers the laying of cables for electrical purposes and includes the laying of ducts and/or conduit for such cables. It could include direct laying of cables in trenches, on racks, in troughs and /or in conduit or ducts. It also encompasses cable pulling methods, pulling tensions, minimum bending radii, reduction of frictional forces, use of supporting plant (e.g. dynamometers, rigging, winches,), working on FRC, PVC, A/C ducted systems and the sealing of cables. |

| Elements | Performance Criteria |
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| 1. Prepare to lay electrical cables | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received and confirmed, if necessary, by site inspection<br>1.2 Relevant requirements and established procedures for the work are discussed with other personnel and identified for all work sites<br>1.3 OHS policies and procedures related to requirements and established procedures for the laying of electrical cables are obtained and confirmed for the purposes of the work to be performed and communicated<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.<br>1.8 Relevant personnel at work site are confirmed current in First Aid and other related work procedures according to requirements. |

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| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.12 | Traffic management plan is identified and implemented. |
| 2. Carry out the laying of electrical cables | 2.1 | OHS, Sustainable Energy and Environmental principles and practices to reduce the incidents of accidents and minimize waste are followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Apply Essential Knowledge and Associated Skills in the safe laying electrical to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
| | 2.4 | ***Electrical cables*** are laid in accordance with the work schedule and requirements/established procedures. |
| | 2.5 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.6 | Unplanned events in the laying of electrical cables are undertaken within the scope of established procedures. |
| | 2.7 | Known solutions to a variety of problems are applied using routine procedures. |
| | 2.8 | On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the laying of electrical cables | 3.1 | Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures. |
| | 3.2 | Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable. |

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| | 3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures.<br>3.5 Relevant work permit(s), works completion records, reports, drawings and/or documentation and information are actually completed and appropriate personnel notified.<br>3.6 Works completion records, reports, as installed / modified drawing/ and/or documentation and information are finalized and processed and appropriate personnel notified |

| **Variance** | **Range** |
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| Laying of cables may be in: | • Direct trenches<br>• On racks<br>• troughs and/or<br>• conduit or<br>• ducts |
| Laying of cables encompasses: | • Cable pulling methods<br>• Pulling tensions<br>• Minimum bending radii<br>• Reduction of frictional forces<br>• Use of supporting plant(e.g. dynamometers, rigging, winches, etc)<br>• Working on FRC, PVC, A/C ducted systems and the cutting and sealing of cables |
| Constants and variables included in this unit are: | may include:<br>• Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information.<br>• Drawings and specifications<br>• Emergency<br>• Environmental and Sustainable Energy Procedures<br>• Environmental legislation |

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| | • Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work Personnel |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Evidence that shows a candidate is able to:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures.<br>• Apply sustainable energy principles and practices.<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures.<br>Demonstrated performance across a representative range of contexts from the prescribed items below:<br>• Knowledge and application of relevant sections of;<br>Environmental Legislative requirements;<br>• Environmental Statutory legislation;<br>• Enterprise/site Environmental and Sustainable energy principles and practice<br>• Apply environmental risk assessment process<br>• Implement, monitor and review environmental procedures during the currency of the work<br>• Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions. |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Stores procedures<br>• Generation power systems<br>• Transmission, distribution and rail power systems<br>• Substations, power transformers and reactors fundamentals.<br>• Underground cable installation<br>• Underground cable construction |
| Underpinning Skills | Demonstrates skills to:<br>• Stores procedures<br>• Generation power systems<br>• Transmission, distribution and rail power systems |

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| | • Substations, power transformers and reactors fundamentals.<br>• Underground cable installation<br>• Underground cable construction |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Install and Maintain De-Energized LV Underground Polymeric Cables** |
| **Unit Code** | **EIS TDM2 03 0612** |
| **Unit Descriptor** | This covers the installation an maintenance of de-energized low voltage underground polymeric cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning and/or re commissioning tests and the updating of system data/ maintenance records. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the installation and maintenance of re-energized LV under ground polymeric cables | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites<br>1.3 OHS policies and procedures related to requirements and established procedures for the installation and maintenance of de-energized LV ***underground*** polymeric cables are obtained and confirmed for the purposes of the work to be performed and communicated<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.7 Resources including personnel, ***equipment***, tools and personal protective equipment required for the job are obtained and confirmed in working order<br>1.8 Relevant personnel at work site are confirmed current in First Aid and other related work procedures according to requirements |

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| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures |
| | 1.12 | Road signs, barriers and warning devices are positioned in accordance with requirements |
| 2. Carry out the installation and maintenance of re-energized LV underground polymeric cables | 2.1 | OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures |
| | 2.2 | Lifting, climbing, working in confined spaces and working aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed |
| | 2.3 | Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures |
| | 2.4 | Essential knowledge and associated skills are applied for the safe installation and maintenance of re-energized LV underground polymeric cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements |
| | 2.5 | De-energized LV underground polymeric cables are installed according to the work schedule and requirements/established procedure |
| | 2.6 | Maintenance, including repair and/or replacement of LV underground polymeric cables is carried out, in accordance with the work schedule and requirements/established procedures |
| | 2.7 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.8 | Unplanned events in the installation and maintenance of de-energized LV underground polymeric cables are undertaken within the scope of established procedures |

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| | 2.9 Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills<br>2.10 On going checks of quality of the work are undertaken in accordance with instructions and established procedures |
| 3. Complete the installation and maintenance of de energized LV underground polymeric cables | 3.1 Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures<br>3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures<br>3.5 Relevant work permit(s) are signed off and LV underground polymeric cables are returned to service in accordance with requirements<br>3.6 Works completion records, reports, drawings and/or documentation and information are finalized and processed and appropriate personnel notified |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to: | • the installation and maintenance of de-energized high voltage underground polymeric cables and covers<br>• the jointing,<br>• terminating,<br>• repair and replacement of cables used in systems and circuits and the issuing/accepting of relevant permits |
| Underground equipment may include: | • links,<br>• fuses,<br>• ring main units,<br>• distribution fuse boxes,<br>• Pad mount and ground transformers,<br>• chamber substations and bus bar/termination boxes |
| Test and recording equipment includes: | • voltage detectors,<br>• cable identification equipment,<br>• Cable spiking equipment and insulation resistance testers. |

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| Jointing and terminating materials include: | • compound and resin filled boxes,<br>• polymeric tape materials,<br>• polymeric heat shrink materials,<br>• "slip-on" molded components and pre-stretched polymeric materials,<br>• compression and mechanical connectors |
| Assessment Jointing and terminating locations include: | • circuit breakers<br>• links<br>• fuses<br>• ring main units<br>• distribution fuse boxes<br>• pad mount and ground transformers<br>• chamber substations and bus bar/termination boxes |
| The following constants and variables included in this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification.<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements.<br>• Testing procedures<br>• Work clearance systems |

| Evidence Guide | |
|---|---|
| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures<br>• Demonstrate performance across a representative range of contexts from the prescribed items below:<br>  • Knowledge and application of relevant sections of;<br>  • Environmental Legislative requirements;<br>  • Environmental Statutory legislation;<br>  • Enterprise/site Environmental and Sustainable energy principles and practice<br>  • Apply environmental risk assessment process<br>  • Implement, monitor and review environmental procedures during the currency of the work<br>  • Dealing with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions. |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Alternating current circuit principles<br>• Magnetism<br>• Electromagnetic principles<br>• Underground cable installation<br>• Fundamentals of jointing LV polymeric cables.<br>• LV polymeric cable jointing principles |
| Underpinning Skills | Demonstrates skills of:<br>• Underground cable installation<br>• Power line safety practices<br>• Alternating current circuit practices<br>• Electromagnetic practices<br>• LV polymeric cable jointing practices |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
|---|---|
| **Unit Title** | **Operate Plant and Equipment Near Live Electrical Conductors/ Apparatus** |
| **Unit Code** | **EIS TDM2 04 0612** |
| **Unit Descriptor** | This covers the safe operation and maintenance of plant and equipment near live electrical conductors and/or apparatus. It encompasses plant and equipment relevant to the enterprise and is in addition to any Commonwealth, State/Territory or Local Government legislation and or regulatory requirements regarding the operation of that plant and or equipment. It includes the conducting of operational checks, the correct positioning of road signs, barriers and or warning devices. It also encompasses the completion of log books and job completion documentation. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare to operate plant and equipment near energized and exposed electrical conductors/ apparatus | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the ***operation of plant and equipment earn energized and exposed electrical conductors/ apparatus*** are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the operation of ***plant and equipment*** near energized and exposed electrical conductors/apparatus are obtained and confirmed for the purposes of the work to be per formed and communicated.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures. |

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| | 1.7 | Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order. |
| | 1.8 | Relevant personnel at worksite are confirmed current in First Aid, Pole Top Rescue and other related work procedures according to requirements. |
| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.12 | Road signs, barriers and warning devices are positioned in accordance with requirements. |
| 2. Carry out the operation of plant and equipment near energized and exposed electrical conductors/ apparatus | 2.1 | OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Apply Essential Knowledge and Associated Skills in the safe operation of plant and equipment near energized and exposed electrical conductors/apparatus to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
| | 2.4 | Plant and equipment are safely operated near energized and exposed electrical conductors/apparatus according to requirements and established procedures. |
| | 2.5 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.6 | Unplanned events in the operation of plant and equipment near energized and exposed electrical conductors/apparatus are undertaken within the scope |

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| | of established procedures.<br>2.7 Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills<br>2.8 On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the operation of plant and equipment near energized and exposed electrical conductors/ apparatus | 3.1 Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.<br>3.5 Relevant work permit(s) are signed off and, plant and equipment are checked, returned to service/stored appropriately, in accordance with requirements and established procedures.<br>3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to the operation of plant and equipment near live electrical conductors and/or apparatus. Support plant may include: | • elevating work platform<br>• back hoes<br>• earth drilling rigs<br>• trench<br>• excavators<br>• heavy vehicles<br>• concrete cutters<br>• compressors,<br>• portable generators<br>• welders<br>• crimper-cutters<br>• pumps<br>• chain-saws<br>• jack-hammers |

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| | • post hole diggers<br>• sand-blasters<br>• drills and self loading vehicle |
| Equipment may include: | • hand operated ratchet and friction grip winches,<br>• chain pullers and block and tackle |
| The following constants and variables included in: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Basic electrical principles<br>• Magnetism<br>• Electromagnetic principles<br>• Electro technology science and materials<br>• Hand tools<br>• Power tools |

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| | • Occupational Health and Safety principles<br>• Engineering applications of mathematical principles<br>• Engineering applications of mechanical principles<br>• Engineering applications of material properties<br>• Elevator work platform operational principles<br>• Hydraulic and pneumatic portable equipment<br>• Enterprise vehicles<br>• Chain saw principles<br>• Generation power systems<br>• Environmental fundamentals<br>• Material handling and the environment<br>• Enterprise specific - policy and procedure instructions<br>• Enterprise specific - OHS instructions<br>• Enterprise specific - technical drawings and documents |
| Underpinning Skills | Demonstrates skills to:<br>• Electrical safe working practice<br>• Hand tools<br>• Power tools<br>• Occupational Health and Safety practices<br>• Enterprise vehicles<br>• Generation power systems<br>• Material handling and the environment<br>• Chain saw practices<br>• Hand tools<br>• Power tools<br>• Engineering applications of material properties<br>• Hydraulic and pneumatic portable equipment |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Fix and Secure Equipment** |
| **Unit Code** | **EIS TDM2 05 0612** |
| **Unit Descriptor** | This competence standard unit covers fixing, securing and mounting techniques as apply in the various electro technology work functions. It encompasses the safe use of hand and portable power tools, safe lifting techniques, safe use of ladders and elevated platforms and the selection and safe application of fixing devices and supporting accessories/equipment. |

| Elements | Performance Criteria |
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| 1. Prepare to fix and secure equipment | 1.1 OHS procedures for a given work area are obtained and understood.<br>1.2 OHS risk control work preparation measures and procedures are followed.<br>1.3 The scope of work to be undertaken is obtained from documentation or from work supervisor.<br>1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.<br>1.5 Sources of materials that may be required for the work are established in accordance with established procedures.<br>1.6 Fixing devices are selected for their suitable ability for the environment, the load they are to support and substratum's into which they are to be installed.<br>1.7 Supporting accessories/equipment is selected for suitability for the environment and ability to support and protect from damage that which they are intended to support.<br>1.8 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety. |
| 2. Install fixing and support devices. | 2.1 Electrical isolation is arranged where work is within arms reach of exposed conductive parts, plant or machinery in strict accordance OHS requirements and procedures.<br>2.2 Other OHS risk control measures relevant to the work site are followed. |

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| | 2.3 Fixing devices are installed in accordance with manufacturers' instructions.<br>2.4 Support accessories/equipment is install accurately and to comply with technical standards and job specifications.<br>2.5 Work is carried out efficiently without unnecessary waste of materials or damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles. |
| 3. Complete fixing and support work. | 3.1 OHS risk control work completion measures and procedures are followed.<br>3.2 Work site is tidied and tools and equipment cleaned and securely stored.<br>3.3 Appropriate personnel are notified of the work completion. |

| **Variable** | **Range** |
|---|---|
| This shall be demonstrated in relation to installation, fault finding, maintenance or development work functions the following disciplines: | • Appliances<br>• Business equipment<br>• Computers<br>• Data Communications<br>• Electrical<br>• Electrical Machines<br>• Electronics<br>• Fire protection<br>• Instrumentation<br>• Refrigeration and Air Conditioning<br>• Renewable / sustainable energy, and<br>• Security technology |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures<br>• Demonstrate performance across a representative range of contexts from the prescribed items below:<br>  • Fix and secure equipment as Range Statement and including: |

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| | • Selecting fixing for loads of < 5 kg, < 20 kg and < 50 kg and suitable for the environment in which they are to be installed.<br>• Fixing to a hollow wall, brick, concrete and steel.<br>• Fixing support accessories/equipment relevant the discipline in which competence is sought.<br>• Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Hand tools<br>• Power tools<br>• Fixing and support devices and techniques<br>• Occupational Health and Safety principles |
| Underpinning Skills | Demonstrates skills to:<br>• Hand tools<br>• Power tools<br>• Fixing and support devices and techniques<br>• Occupational Health and Safety practices |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
|---|---|
| **Unit Title** | **Lay Wiring and Terminate Accessories for Extra-Low Voltage Circuits** |
| **Unit Code** | **EIS TDM2 06 0612** |
| **Unit Descriptor** | This unit covers the laying of wiring/cabling, connection of accessories and continuity and insulation resistance testing of circuits intended to operate at extra-low voltage. Typically this includes circuits and accessories for ELV powered devices, security, controls, integrated systems, audio/video systems and the like. It encompasses the principles of single source, single load power circuits, control circuits and communications circuits, safe working practices and following work processes that satisfy electrical principles for safety and functionality. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare to lay wiring/cabling and connect accessories for extra-low voltage circuits. | 1.1 OHS procedures for a given work area are obtained and understood through established routines.<br>1.2 Established OHS risk control measures in preparation for the work are followed.<br>1.3 Safety hazards not previously been identified are reported and advice on risk control measures are sought from the work supervisor.<br>1.4 The nature and location of the work is obtained from work supervisor or other appropriate person to establish the scope of work to be undertaken.<br>1.5 Advice is sought from the work supervisor or other appropriate person to ensure the work is coordinated effectively with others.<br>1.6 Sources of materials that may be required for the work are established in accordance with established routines.<br>1.7 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety. |
| 2. Lay wiring/cabling and connect accessories for extra-low voltage circuits. | 2.1 Established OHS risk control measures for carrying out the work are followed.<br>2.2 Circuits/machines/plant are checked as being isolated where necessary in strict accordance OHS requirements and procedures.<br>2.3 ***Wiring and accessories*** are installed to comply standards and job specifications with sufficient excess |

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| | to affect terminations.<br>2.4 Accessories are installed straight and square in the required locations and within acceptable tolerances.<br>2.5 Cables and conductors are terminated at accessories in accordance with manufacture's specifications and regulatory requirements.<br>2.6 Cables installed for future service and marked in accordance with the cable identification scheme and terminated incompliance with regulatory requirements.<br>2.7 Procedures for referring non-routine events to immediate supervisor for directions are followed.<br>2.8 ***Cable installation*** and termination is carried out efficiently without unnecessary waste of materials or damage to apparatus, circuits or the surrounding environment and using sustainable energy practices. |
| 3. Complete and report work activities | 3.1 OHS work completion risk control measures and procedures are followed.<br>3.2 Work site is cleaned and made safe in accordance with established procedures.<br>3.3 Work supervisor is notified of the completion of the installation work in accordance with established routines. |

| **Variable** | **Range** |
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| This shall be demonstrated in relation to laying wiring/cabling and connecting accessories for extra-low voltage power and control cabling systems circuits using: | • cabling and connecting accessories for extra-low voltage power and At least one of the following wiring/cabling systems:<br>• Unenclosed thermoplastic sheathed (TPS) cable<br>• Enclosed thermoplastic insulated (TPI) or sheathed cables, and at least three of the following wiring/cabling systems:<br>– single cable<br>– flexible cable<br>– flexible cord<br>– shielded cable<br>– armoured cable<br>– ribbon cable<br>– other similar and like cable |

| Evidence Guide | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement occupational health and safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures<br>• Demonstrate performance across a representative range of contexts from the prescribed items below:<br>• Lay wiring/cabling and terminate accessories for extra-low voltage in power and control circuits, Range Statement and including:<br>  • understanding the nature of the work<br>  • selecting appropriate tools, cables and accessories<br>  • following appropriate cable routes<br>  • installing cable and accessories to requirements<br>  • terminating cables and accessories to manufacture's specifications and requirements<br>  • cleaning worksite and notifying completion of work using established procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Cable protection and support<br>• Cables in buildings, structures and premises<br>• Basic cable and conductor terminations<br>• Technical standards, regulations and codes for extra-low voltage work<br>• Environmental and heritage awareness<br>• Occupational Health and Safety principles |
| Underpinning Skills | Demonstrates skills to:<br>• Cable protection and support<br>• Cable types and applications<br>• Cables in buildings, structures and premises<br>• Basic cable and conductor terminations<br>• Environmental and heritage awareness<br>• Technical standards, regulations and codes for extra-low voltage work practices |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Solve Problems in Single and Three Phase Low Voltage Circuits** |
| **Unit Code** | **EIS TDM2 07 0612** |
| **Unit Descriptor** | This unit covers ascertaining correct operation of single and three phase circuits and solving circuit problems as they apply to servicing, fault finding, and installation and compliance work functions. It encompasses safe working practices, multiphase circuit arrangements, issues related to protection, power factor and MEN systems and solutions to circuit problems derived from calculated and measured parameters. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare to solve single and three phase low voltage circuit problems. | 1.1 OHS procedures for a given work area are obtained and understood.<br>1.2 Established OHS risk control measures and procedures in preparation for the work are followed.<br>1.3 Safety hazards, which have not previously been identified, are noted and established risk control measures are implemented.<br>1.4 The nature of the ***circuit(s) problem*** is obtained from documentation or from work supervisor to establish the scope of work to be undertaken.<br>1.5 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others.<br>1.6 Sources of materials that may be required for the work are established in accordance with established procedures.<br>1.7 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety. |
| 2. Solve single and three phase low voltage Circuit problems. | 2.1 OHS risk control measures and procedures for carrying out the work are followed.<br>2.2 The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.<br>2.3 Circuits/machines/plant is checked as being isolated where necessary in strict accordance OHS requirements and procedures. |

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| | 2.4 Established methods are used to solve circuit problems from measure and calculated values as they apply to single and three-phase low voltage circuit.<br>2.5 Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented.<br>2.6 Unexpected situations are dealt with safely and with the approval of an authorized person.<br>2.7 Problems are solved without unnecessary damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices. |
| 3. Complete work and document problem solving activities. | 3.1 OHS work completion risk control measures and procedures are followed.<br>3.2 Work site is cleaned and made safe in accordance with established procedures.<br>3.3 Justification for solutions used to solve circuit problems is documented.<br>3.4 Work completion is documented and an appropriate person or persons notified in accordance with established procedures. |

| **Variable** | **Range** |
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| This unit shall be demonstrated in relation to any four of the following problems for both single and three-phase circuit. | • Determining the operating parameters of existing circuits<br>• Alternating an existing circuit to comply with specified operating parameters<br>• Developing circuits to comply with a specified function and operating parameters<br>Note: Operating parameters include:<br>• voltage,<br>• current,<br>• impedance,<br>• power and power factor<br>• Determining the cause of low power factor in an existing circuit.<br>• Determining conditions causing an existing circuit to be unsafe.<br>Note: Examples of:<br>• unsafe circuits include:<br>  • electric shock hazard from indirect contract with conductive parts, insufficiently low impedance of a fault current path and<br>  • inadequate fault protection |

| Evidence Guide | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures<br>• Demonstrate performance across a representative range of contexts from the prescribed items below:<br>  • Solve problems in electromagnetic circuits as described as range statement and including<br>  • Determining the operating parameters of existing circuits.<br>  • Alternating an existing circuit to comply with specified operating parameters.<br>  • Developing circuits to comply with a specified function and operating parameters.<br>  • Determining the cause of low power factor in an existing circuit.<br>  • Determining conditions causing an existing circuit to be unsafe.<br>  • Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions. |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Alternating current principles - power<br>• Occupational health and safety principles<br>• Electrical safe working practice |
| Underpinning Skills | Demonstrates skills to:<br>• Electrical safe working practice<br>• Occupational health and safety practices |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Install and Maintain Poles / Structures and Associated Hardware** |
| **Unit Code** | **EIS TDM2 08 0612** |
| **Unit Descriptor** | This covers the installation and maintenance of poles and/or structures and associated hardware, other than towers, which may consist of wood, steel, concrete or composite type material. It includes the fixing and or securing of hardware associated as well as the repair and or replacement of poles and or structures used in the distribution and or rail traction industry sectors. It encompasses the implementation of a suitable traffic management plan. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the installation and maintenance of poles and/or structures and associated hardware | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures the installation and maintenance of poles and/or structures and associated hardware are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.<br>1.7 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.8 Relevant personnel at worksite are confirmed current in First Aid, Pole Top Rescue and other related work |

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| | | procedures according to requirements. |
| | 1.9 | Liaison and communication issues with other/ authorized authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed here applicable in accordance with established procedures. |
| | 1.12 | Traffic management plan is identified and implemented. |
| 2. Carry out installation and maintenance of poles and/or structures and associated hardware | 2.1 | OHS, Sustainable Energy and Environmental principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.3 | Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.4 | Apply Essential Knowledge and Associated Skills in the safe installation of poles and/or structures and their associated hardware to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
| | 2.5 | ***Poles and/or structures*** and their associated hardware to be installed are stabilized according to requirements. |
| | 2.6 | ***Installation*** is carried out, in accordance with the work schedule and requirements/established procedures. |
| | 2.7 | Maintenance, including repair and/or replacement of poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures. |
| | 2.8 | Unplanned events in the installation of poles and/or structures and associated hardware are undertaken within the scope of established procedures. |
| | 2.9 | Known solutions to a variety of problems are applied |

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| | | using acquired essential knowledge and associated skills |
| | 2.10 | On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the installation and maintenance of poles and/or structures and associated hardware. | 3.1 | Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures. |
| | 3.2 | Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable. |
| | 3.3 | Work site is rehabilitated, cleaned up and made safe in accordance with established procedures. |
| | 3.4 | Tools, ***equipment*** and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures. |
| | 3.5 | Relevant work permit(s) are signed off and, poles and/or structures and their associated hardware are returned to service in accordance with requirements. |
| | 3.6 | Works completion records, reports, as installed / modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to the installation of poles and or structures which may include : | • basic inspection<br>• removal<br>• repair and replacement of<br>• poles and/or structures<br>• including welding<br>• pole staking and rebutting |
| Pole types and structures<br>Equipment may include: | Pole types and structures:<br>• wood<br>• concrete<br>• steel and composite<br>Maintenance may include:<br>• the basic inspection<br>• removal<br>• repair and replacement of poles including welding,<br>• pole staking and rebutting<br>Associated hardware includes: |

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| | • insulators<br>• cross arms<br>• stays<br>• earth down leads and bond wires<br>• cross arm braces<br>• pole steps<br>• shackle straps and associated bolts and clamps<br>• cantilever<br>• assembly<br>• pull off<br>• head span<br>• portal<br>• drop tube<br>Pole stabilization techniques include:<br>• back-fill consolidation<br>• concreting<br>• baulking<br>• reinforcement nailing<br>• approved steel reinforcing and temporary and permanent stay-wires<br>Methods of erection may include:<br>• crane<br>• auger/erector<br>• winch/'A' frame<br>• lifting apparatus and<br>• helicopter lift |
| The following constants and variables included in the element/Performance Criteria in this unit<br>are fully described and form an integral part of the Range Statement of this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration<br>• Documenting detail work events,<br>• record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedure<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards |

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| | • Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance systems |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Alternating current circuit principles<br>• Electromagnetic principles<br>• Engineering applications of mathematical principles<br>• Engineering applications of mechanical principles<br>• Engineering applications of material properties<br>• Basic rigging techniques<br>• Stores procedures<br>• Generation power systems<br>• Transmission, distribution and rail power systems<br>• Substations, power transformers and reactors<br>• Pole and hardware installation<br>• Power line safety practices |
| Underpinning Skills | Demonstrates skills to:<br>• Basic rigging techniques<br>• Stores procedures<br>• Generation power systems<br>• Transmission, distribution and rail power systems<br>• Substations, power transformers and reactors<br>• Pole and hardware installation<br>• Power line safety practices<br>• Substations, power transformers and reactors |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to |

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| | information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution Inspection and Maintenance Level II | |
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| **Unit Title** | **Install and Maintain Overhead Conductors and Cables (Poles and Structures)** |
| **Unit Code** | **EIS TDM2 09 0612** |
| **Unit Descriptor** | This covers the installation and maintenance of overhead conductors and cables used on poles and structures (excluding towers) which includes the stringing, tensioning and terminating of the conductor/cable, as well as the cleaning of insulators (de-energized), the securing of the conductor to the insulators or supports and the undertaking of the electrical connections. It also covers maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the completion of other enterprise tests. It also encompasses the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits and the updating of system data/maintenance records according to requirements and established procedures. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the installation and maintenance of overhead conductors and cables used on poles and/or structures | 1.1 Plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the installation and maintenance of overhead conductors and cables used on poles and/or structures are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures. |

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| | 1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.<br>1.8 Relevant personnel at worksite are confirmed current in First Aid, Pole Top Rescue and other related work procedures according to requirements.<br>1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary.<br>1.10 Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures.<br>1.11 Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.<br>1.12 Traffic management plan is identified and implemented. |
| 2. Carry out installation and maintenance of overhead conductors and cables used on poles and/or structures | 2.1 OHS, Sustainable Energy and Environmental principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures.<br>2.2 Lifting, climbing, working aloft, rescue and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.<br>2.3 Confirm systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures.<br>2.4 Apply Essential Knowledge and Associated Skills in the safe installation and maintenance of overhead conductors and cables used on poles and/or structures to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.<br>2.5 ***Overhead conductor***/cables are strung, tensioned and terminated as per requirements/established procedures.<br>2.6 Insulators are cleaned and conductors and anti vibration devices, spaces/spreaders are secured as per established procedures.<br>2.7 Electrical connections are made in accordance with the requirements/ established procedures.<br>2.8 ***Maintenance***, including repair and/or replacement of |

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| | ***overhead conductors*** and cables used on poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.<br>2.9 Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures.<br>2.10 Unplanned events in the installation and maintenance of overhead conductors and cables used on poles and/or structures are undertaken within the scope of established procedures.<br>2.11 Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills<br>2.12 On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the installation and maintenance of overhead conductors and cables used on poles and/or structures | 3.1 Work undertaken is checked against works schedule for confirmation of phasing and conformance with requirements and, anomalies reported in accordance with established procedures.<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures.<br>3.5 Relevant work permit(s) are signed off and, overhead conductors and cables used on poles and/or structures are returned to service in accordance with requirements.<br>3.6 Conductors/Cables are tested and commissioned in accordance with enterprise requirements and procedures.<br>3.7 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to: | the installation and maintenance of overhead conductors and cables used on poles and structures |
| Installation and maintenance may include: | • the stringing<br>• tensioning<br>• terminating of the conductor/cable and the removal<br>• repair and replacement of cables<br>• conductors and associated<br>• hardware and includes the cleaning of insulators<br>May include:<br>• pre-energized/ energisation checks and tests<br>• visual inspections<br>• diagnosing maintenance work associated with the fault diagnosis, conducting of visual inspections<br>• confirmation of phasing and the completion of other enterprise tests is also included<br>• it also encompasses the isolation of systems and circuits,<br>• the procedure of issuing/accepting electrical access permits and the updating of system<br>• data/maintenance records according to requirements and established procedures Structures include poles and columns |
| Types of conductor include: | • copper<br>• aluminum<br>• steel<br>• aluminum conductor steel reinforced<br>• (ACSR)<br>• low voltage aerial bundled cable (LVABC)<br>• high voltage aerial bundled cable(HVABC)<br>• insulated unscreened cable (IUC)<br>• service cable and fiber optic<br>• pilot and control cables<br>Overhead systems includes:<br>• their associated earthing systems, e.g. MEN and CMEN LV systems<br>• bridging/ bonding and conventional and SWER HV systems |
| Overhead systems include: | • their associated earthing systems, e.g. MEN and CMEN LV systems<br>• bridging/ bonding and conventional and SWER HV systems |
| Plant may include: | • elevating work platform<br>• winches and capstans<br>• specialist tension stringing<br>• equipment<br>• cable trailers and cable drum stands |

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| Testing and recording equipment includes: | (LV) includes:<br>• voltage detectors<br>• tong ammeters<br>• polarity testers<br>• insulation resistance testers<br>• recording meters and phase sequence indicators<br>(HV) includes:<br>• phasing sticks<br>• fault indicators<br>• radio frequency interference detectors and voltage detectors |
| The following constants and variables included in the Range Statement of this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification.<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance systems |

| Evidence Guide | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement occupational health and safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Power line distribution installation<br>• Power line installation safety<br>• Low voltage electrical service installation |
| Underpinning Skills | The following skills must be assessed as part of this unit:<br>• Power line distribution installation<br>• Power line installation safety<br>• Low voltage electrical service installation |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Erect and Maintain Transmission Towers and Associated Hardware** |
| **Unit Code** | **EIS TDM2 10 0612** |
| **Unit Descriptor** | This covers the erection and maintenance of non-energized, pyramid, delta, Pi or enterprise specific transmission towers and associated hardware. It includes the erection, repair, and or replacement of components in accordance with construction plans, specifications, work orders and standing enterprise requirements. Erection and maintenance could also involve cleaning and welding. The updating of system data, records and or completion of relevant documentation in accordance with enterprise requirements also forms part of this competence. |

| Elements | Performance Criteria |
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| 1. Prepare to erect and maintain transmission towers and associated hardware | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the erection and maintenance of towers and associated hardware are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order. |

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| | 1.8 Relevant personnel at work site are confirmed current in First Aid, Tower/Pole Top Rescue and other related work procedures according to requirements.<br>1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary.<br>1.10 Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.<br>1.11 Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures.<br>1.12 Traffic management plan is identified and implemented |
| 2. Carry out the erection and maintenance of transmission towers and associated hardware | 2.1 OHS, sustainable energy and environmental principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures.<br>2.2 ***Towers*** and associated hardware to be erected are stabilized according to requirements.<br>2.3 Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed.<br>2.4 Essential knowledge and associated skills are applied in the safe erection and ***maintenance*** of towers and associated hardware to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.<br>2.5 Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures.<br>2.6 Erection and maintenance, including repair and/or replacement of towers is carried out, in accordance with the work schedule and requirements/established procedures.<br>2.7 Unplanned events in the erection and maintenance of towers and associated hardware are undertaken within the scope of established procedures.<br>2.8 Known solutions to a variety of problems are applied |

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| | using acquired essential knowledge and associated skills.<br>2.9 On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the erection and maintenance of transmission towers and associated hardware | 3.1 Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures.<br>3.5 Relevant work permit(s) are signed off and, towers and associated hardware are returned to service in accordance with requirements.<br>3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| Tower types | May include:<br>• pyramid<br>• delta and pi and<br>• other enterprise specific types |
| Maintenance | May include:<br>• the removal, repair and replacement of tower components, including welding where appropriate; and the replacement, repair and cleaning of associated hardware |
| The following constants and variables included in this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information |

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| | • Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance systems |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Basic rigging techniques<br>• Stores procedures<br>• Substations, power transformers and reactors<br>• Alternating current principles - power<br>• Magnetism<br>• Electromagnetic principles |
| Underpinning Skills | Demonstrates skills to:<br>• Generation power systems<br>• Transmission, distribution and rail power systems<br>• Transmission structures and hardware<br>• Power line safety practices<br>• Routine maintenance on transmission structures<br>• Alternating current practices - power<br>• Magnetism |

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| | • Electromagnetic practices |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Install and Maintain De-Energized LV Underground Paper Insulated Cables** |
| **Unit Code** | **EIS TDM2 11 0612** |
| **Unit Descriptor** | This covers the installation and maintenance of de-energized low voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables. It includes the isolation of systems and circuits, the procedure of issuing/accepting electrical access permits, the undertaking of pre-commissioning tests and the updating of system data/maintenance records. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the installation and maintenance of de-energized LV underground paper insulated cables | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites<br>1.3 OHS policies and procedures related to requirements and established procedures for the installation and maintenance of de-energised LV ***underground*** paper insulated cables are obtained and confirmed for the purposes of the work to be performed and communicated<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.<br>1.8 Relevant personnel at work site are confirmed current in First Aid and other related work procedures according to requirements |

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| | 1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary.<br>1.10 Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures<br>1.11 Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures<br>1.12 Traffic management plan is identified and implemented. |
| 2. Carry out installation and maintenance of de-energized LV underground paper insulated cables | 2.1 OHS, sustainable energy and environmental principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures<br>2.2 Lifting, climbing, working in confined spaces and aloft, and use of power tools/***equipment***, techniques and practices are safely followed and, currency according to requirements confirmed<br>2.3 Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements/permits and established procedures<br>2.4 Essential knowledge and associated skills are applied in the safe ***installation and maintenance*** of de-energised LV underground paper insulated ***cables*** to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements<br>2.5 De-energised LV underground paper insulated cables are installed according to the work schedule and requirements/established procedures<br>2.6 Maintenance, including repair and/or replacement of de-energised LV underground paper insulated cables is carried out, in accordance with the work schedule and requirements/established procedures<br>2.7 Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures.<br>2.8 Unplanned events in the installation and maintenance of de-energised LV underground paper insulated cables are undertaken within the scope of established |

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| | procedures<br>2.9 Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills<br>2.10 On going checks of quality of the work are undertaken in accordance with instructions and established procedures |
| 3. Complete the installation and maintenance of de-energized LV underground paper insulated cables | 3.1 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.2 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures<br>3.3 Relevant work permit(s) are signed off and, the LV underground paper insulated cables are returned to service in accordance with requirements<br>3.4 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to: | • the installation and maintenance of de-energized low voltage underground paper insulated cables and covers the jointing, terminating, repair and replacement of cables |
| Installation and Maintenance may include: | • the repair and replacement of cables and associated hardware |
| Types of cables includes: | • Paper-Insulated which refers to LV solid paper insulated metal sheathed.<br>• Underground equipment may include links,<br>• fuses,<br>• disconnect boxes,<br>• ring main units,<br>• distribution fuse boxes,<br>• pad mount and ground transformers,<br>• chamber substations,<br>• LV |
| Underground equipment may include: | • links,<br>• fuses,<br>• disconnect boxes,<br>• ring main units,<br>• distribution fuse boxes, |

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| | • pad mount and ground transformers,<br>• chamber substations,<br>• LV switchboards,<br>• pillars/turrets,<br>• bus bar/termination boxes,<br>• street lighting control gear and street lighting columns |
| Test and recording equipment may include: | • voltage detectors,<br>• tong ammeters,<br>• Cable identification equipment,<br>• cable fault locating equipment and<br>• insulation resistance testers |
| Jointing and terminating materials may include: | • compound and resin filled boxes,<br>• paper tape materials,<br>• polymeric tape materials,<br>• polymeric heat shrink materials,<br>• "slip-on" molded<br>• components and pre-stretched polymeric materials,<br>• compression, mechanical,<br>• welded and solder lugs and ferrules |
| Jointing and terminating locations may include: | • links,<br>• fuses,<br>• disconnect boxes,<br>• ring main units,<br>• distribution fuse boxes,<br>• pad mount and ground transformers,<br>• chamber substations,<br>• LV switchboards,<br>• pillars/turrets, bus bar/termination boxes,<br>• street lighting control points and street lighting columns |
| The following constants and variables included in the Range Statement of this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform.<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration.<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and Sustainable Energy Procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures |

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| | • Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance systems |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Alternating current principles - power<br>• Magnetism<br>• Electromagnetic principles<br>• LV Paper lead cable jointing principles |
| Underpinning Skills | Demonstrates skills to:<br>• LV Paper lead cable jointing practices<br>• Electromagnetic practices<br>• Alternating current practices – power<br>• Power line safety practices |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Joint and Maintain Energized LV Underground Polymeric Cables** |
| **Unit Code** | **EIS TDM2 12 0612** |
| **Unit Descriptor** | This covers the jointing and maintenance of energised low voltage underground polymeric cables according to established enterprise procedures. It covers the use of specialised live working equipment, tools and devices, the issuing and/or accepting electrical access permits and or relevant working documentation and the undertaking of authorized cable testing procedures. It also encompasses the pre-commissioning and/or re-commissioning tests and the updating of system data/maintenance records. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the jointing and maintenance of energised LV underground polymeric cables | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the jointing and maintenance of energised LV ***underground*** polymeric cables are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.<br>1.8 Specialist equipment for live working is inspected and |

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| | | confirmed in working order as per requirements and established procedures. |
| | 1.9 | Relevant personnel at work site are confirmed current in First Aid, Pole Top Rescue and other related work procedures according to requirements. |
| | 1.10 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.11 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.12 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.13 | Road signs, barriers and warning devices are positioned in accordance with requirements. |
| 2. Carry out jointing and maintenance of energised LV underground polymeric cables | 2.1 | OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power tools/***equipment***, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Essential knowledge and associated skills are applied in the safe jointing and ***maintenance*** of energised LV ***underground*** polymeric cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
| | 2.4 | Cable(s), ***underground equipment***, associated hardware and surrounds are prepared in accordance with established procedures. |
| | 2.5 | ***Joint and termination procedures*** of energised LV cable(s) are carried out in accordance with the work schedule and requirements/established procedures. |
| | 2.6 | Authorized cable testing procedures and fault identification and location process are implemented in accordance with requirements and established procedures. |
| | 2.7 | Maintenance, including repair and/or replacement of energised LV underground polymeric cables is carried out, in accordance with the work schedule and |

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| | requirements/established procedures.<br>2.8 Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures.<br>2.9 Unplanned events in the jointing and maintenance of energised LV underground polymeric cables are undertaken within the scope of established procedures.<br>2.10 Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.<br>2.11 On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the jointing and maintenance of energised LV underground polymeric cables | 3.1 Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.<br>3.5 Relevant work permit(s) are signed off and, LV underground polymeric cables are returned to service in accordance with requirements.<br>3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to: | • the jointing and maintenance of energized low voltage underground polymeric cables and covers the jointing, repair and replacement of cables using specialized live working equipment, tools and devices |
| Maintenance | My include:<br>• the repair and replacement of cables and associated hardware |

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| Underground equipment | May include:<br>• ring main units,<br>• distribution fuse boxes,<br>• pad mount and ground transformers,<br>• chamber substations,<br>• LV switchboards,<br>• pillars/turrets,<br>• bus bar/termination boxes,<br>• street lighting control gear and<br>• street lighting columns |
| Test and recording equipment includes: | • voltage detectors,<br>• tong ammeters,<br>• cable identification equipment, and<br>• insulation resistance testers |
| Jointing and terminating materials include: | • compound and resin filled boxes,<br>• polymeric tape materials,<br>• polymeric heat shrink materials,<br>• "slip-on" molded components and pre-stretched<br>• polymeric materials,<br>• compression and mechanical connectors |
| Jointing and terminating locations include: | • ring main units,<br>• distribution fuse boxes,<br>• pad mount and ground transformers,<br>• chamber substations,<br>• LV switchboards,<br>• pillars/turrets,<br>• bus bar/termination boxes,<br>• street lighting control points and<br>• street lighting columns |
| The following constants and variables included this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures |

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| | • Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance systems |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Low voltage - energized working practices for substations<br>• Power line safety practices |
| Underpinning Skills | Demonstrates skills to:<br>• Low voltage - energized working practices for substations<br>• Power line safety practices |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
|---|---|
| **Unit Title** | **Perform LV Field Switching Operation to a Given Schedule** |
| **Unit Code** | **EIS TDM2 13 0612** |
| **Unit Descriptor** | This covers the conducting of low voltage switching operations involving the operation of circuit breaking and isolation devices from a given switching schedule and in accordance with enterprise procedures. It covers low voltage distribution systems in field situations but also includes paralleling in accordance with the switching schedule. It also encompasses the procedure of; communicating with the Switching Control Officer or Electrical Control Officer, isolating the electrical equipment and the line or work site, as well as proving that the area is de-energized and earthed, issuing/ accepting electrical permits and the returning of the affected circuits to service. |

| Elements | Performance Criteria |
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| 1. Prepare for the LV field switching to a given schedule | 1.1 ***Switching*** and work schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for LV switching are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant authority is obtained to perform work according to requirements and/or established procedures.<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.<br>1.8 Relevant personnel at worksite are confirmed current in |

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| | | First Aid and other related work procedures according to requirements. |
| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.12 | Road signs, barriers and warning devices are positioned in accordance with requirements. |
| 2. Carry out LV field switching to a given schedule | 2.1 | OHS and Sustainable Energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Apply Essential Knowledge and Associated Skills in the safe LV field switching to a given schedule to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
| | 2.4 | Communications with Switching Control Officer are established and maintained throughout the isolation operation according to established procedures. |
| | 2.5 | Electrical equipment and associated circuits line/network or work site to be switched including paralleling is isolated and proved de-energized using appropriate devices and earthed where required according to requirements and established procedures. |
| | 2.6 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.7 | Unplanned events occurring during LV field switching to a given schedule are responded to and undertaken within the scope of established procedures. |
| | 2.8 | Known solutions to a variety of problems are applied |

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| | | using acquired essential knowledge and associated skills. |
| | 2.9 | On going checks of quality of the work are undertaken in accordance with instructions and established procedures |
| 3. Complete the LV field switching to a given schedule | 3.1 | Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures. |
| | 3.2 | Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable. |
| | 3.3 | Work site is rehabilitated, cleaned up and made safe in accordance with established procedures. |
| | 3.4 | Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures. |
| | 3.5 | Relevant permit(s) are signed off, safety devices are removed, and the system is re-energized and returned to service in accordance with requirements/established procedures. |
| | 3.6 | Works completion records, reports, as installed /modified drawing and/or documentation and information are finalized and processed and appropriate personnel and authority notified. |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to: | • the conducting of low voltage switching operations involving the operation of circuit breaking and isolation devices from a given switching schedule as it relates to low voltage distribution systems in Field situations but also includes paralleling in accordance with the switching schedule |
| Operation of circuit isolation devices associated with energy reticulation systems/networks is confined to: | • low voltage systems in field situations which are performed in accordance with a switching schedule and established procedures |

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| Switching Control Officer refers to: | • an appropriate person designated as such by regulations,<br>• codes or enterprise arrangements who is responsible for coordinating and directing switching activities in consultation with field operatives |
| Switchgear may include: | • Low Voltage fuses<br>• Low Voltage links and bridges |
| Specialist tools and devices may include: | • Low Voltage detectors<br>• Low Voltage polarity testers<br>• Low Voltage phase rotation indicators |
| Switching program/schedule refers to: | • structure, switch or equipment number and locations<br>• low voltage distributor<br>• spur or feeder<br>• outage times<br>• works order/plan |
| The following constants and variables included in the Range Statement of this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance systems |

| Evidence Guide | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Switchgear installation<br>• Low voltage switching principles |
| Underpinning Skills | Demonstrates skills to:<br>• Switchgear installation<br>• Low voltage switching |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Install and Maintain Public Lighting Systems** |
| **Unit Code** | **EIS TDM2 14 0612** |
| **Unit Descriptor** | This covers the installation maintenance and repair of public lighting systems. This also includes the inspection, testing and commissioning of the system associated with the street lighting circuit, the associated hardware and the earthling system. Installation will include the installation of, the associated hardware and components and, the wiring and earthling system. Maintenance may also include work on energized LV overhead or underground public lighting systems including the diagnosis of faults and the updating of relevant system data and or public lighting maintenance records. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the installation and maintenance of public lighting systems | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the installation and maintenance of public lighting systems are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.<br>1.8 Relevant personnel at worksite are confirmed current in |

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| | | First Aid, Pole Top Rescue and other related work procedures according to requirements. |
| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.12 | Traffic management plan is identified and implemented. |
| 2. Carry out installation and maintenance of public lighting systems | 2.1 | OHS, Sustainable Energy and Environmental principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Apply Essential Knowledge and Associated Skills in the safe installation and ***maintenance*** of ***public lighting*** systems to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
| | 2.4 | Excavation/foundation construction is inspected, and confirmed as being in accordance with established procedures. |
| | 2.5 | ***Associated hardware***, fittings and control gear are installed as per established procedures. |
| | 2.6 | Earthling system and street lighting circuit is installed as per established procedures. |
| | 2.7 | Inspection of public lighting and associated hardware is conducted to ascertain that it conforms to requirements/established procedures. |
| | 2.8 | Maintenance, including repair and/or replacement of the public lighting system is carried out, in accordance with the work schedule and requirements/established procedures. |
| | 2.9 | Hazard warnings and safety signs are recognized and |

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| | hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures.<br>2.10 Unplanned events in the installation and maintenance of public lighting systems are undertaken within the scope of established procedures.<br>2.11 Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills<br>2.12 On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the installation and maintenance of public lighting systems | 3.1 Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, ***equipment*** and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures.<br>3.5 Relevant work permit(s) are signed off and, the public lighting system is returned to service in accordance with requirements.<br>3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| Competence shall be demonstrated in relation to: | • the installation,<br>• maintenance and repair of public lighting systems, including the inspection, testing and commissioning of the system associated with the street lighting circuit, the associated hardware and<br>• the earthing system |
| Maintenance may include: | • the removal,<br>• repair,<br>• replacement and cleaning of public lighting and<br>• associated hardware |

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| Public lighting system may include: | • lanterns/luminaires,<br>• lamps or control equipment in overhead and underground reticulated areas,<br>• poles and<br>• columns |
| Associated hardware may include: | • brackets, choke boxes,<br>• photo-electric cells,<br>• time switches,<br>• contactor boxes and appropriate nuts and bolts |
| Testing equipment may include: | • LV detectors and fault indicators |
| The following constants and variables included in the Range Statement of this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform.<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification.<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance systems |

| Evidence Guide | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Installation and maintenance of public lighting and associated equipment |
| Underpinning Skills | Demonstrates skills to:<br>• Installation and maintenance of public lighting and associated equipment |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
|---|---|
| **Unit Title** | **Install and Maintain Low Voltage Services (Underground)** |
| **Unit Code** | **EIS TDM2 15 0612** |
| **Unit Descriptor** | This unit covers the installation; maintenance and connection of low voltage underground service lines and associated equipment (between the connection point and the point of supply - customers' premises). Maintenance includes the repair and replacement of service cables, service fuses and the replacement and repair of service hardware, the identification and rectification of faults. It also covers insulation, voltage, and polarity testing and phase rotation. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the installation and maintenance of LV underground services and associated equipment | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the ***installation*** and ***maintenance*** of LV underground ***services*** and associated equipment are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established ***procedures.***<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.<br>1.8 Relevant personnel at worksite are confirmed current in First aid, rescue and other related work procedures |

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| | | according to requirements. |
| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.12 | Road signs, barriers and warning devices are positioned in accordance with requirements. |
| 2. Carry out installation and maintenance of LV underground services and associated equipment | 2.1 | OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Apply essential knowledge and associated skills in the safe installation and maintenance of LV underground services and associated equipment to ensure completion to quality standards with a minimum of waste according to requirements. |
| | 2.4 | LV underground services and associated equipment are installed according to the work schedule and requirements/established procedures. |
| | 2.5 | Maintenance, including repair and/or replacement of LV services and associated equipment is carried out, in accordance with the work schedule and requirements/established procedures. |
| | 2.6 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.7 | Unplanned events during the installation and maintenance of LV services and associated equipment are undertaken within the scope of established procedures. |
| | 2.8 | Known solutions to a variety of problems are applied using acquired essential knowledge and associated |

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| | skills.<br>2.9 On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the installation and maintenance of LV underground services and associated equipment | 3.1 Work undertaken is checked /tested against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, ***equipment*** and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.<br>3.5 Relevant work permit(s) are signed off and, the LV services and associated equipment are returned to service in accordance with requirements.<br>3.6 Works completion records, reports, as installed/modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to: | • the installation and maintenance of underground low voltage services as they relate to distribution circuits and associated equipment and includes the identification of faults |
| Installation may include: | • the laying and connection of service cables<br>• connection of the service<br>• cable to underground equipment<br>• the fitting and connection of fuses or circuit breakers and<br>• the testing and commissioning of the service |
| Service includes: | • the connection between the customers' point of supply and the underground pillar/pit connection (single phase),<br>• underground pillar/pit connection (three phase) and or underground to overhead connection |
| Maintenance may include: | • the identification and diagnosis of faults<br>• the removal, replacement or repair of service cables and associated hardware |

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| | • the temporary installation of services and associated equipment and<br>• the testing and commissioning of the service |
| Testing procedures may include: | • continuity<br>• polarity<br>• phase rotation<br>• insulation resistance and voltage |
| Testing equipment may include: | • digital/analogue voltage testers<br>• multi meters<br>• phase rotation testers<br>• load testers<br>• insulation resistance and<br>• continuity testers |
| Associated hardware may include: | • fuse units<br>• circuit breakers<br>• contactors<br>• mains connection boxes |
| The following constants and variables included in the Range Statement of this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification.<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems |

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| | • Requirements<br>• Testing procedures<br>• Work clearance systems |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Power line installation safety<br>• Low voltage electrical underground service<br>• installation |
| Underpinning Skills | Demonstrates skills to:<br>• Power line installation safety<br>• Low voltage electrical underground service installation |
| Resources Implication | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Install and Maintain Low Voltage Services (Overhead)** |
| **Unit Code** | **EIS TDM2 16 0612** |
| **Unit Descriptor** | This covers the installation, maintenance and connection of low voltage overhead service lines and associated equipment (between the connection point and the point of supply - customers' premises). Maintenance includes the repair and replacement of service cables, service fuses and the replacement and repair of service hardware, the identification and rectification of faults. It also covers insulation, voltage, and polarity testing and phase rotation. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the installation and maintenance of LV overhead services and associated equipment | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the ***installation*** and ***maintenance*** of LV overhead services and associated ***equipment*** are obtained and confirmed for the purposes of the work to be performed and communicated<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established ***procedures.***<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.<br>1.8 Relevant personnel at worksite are confirmed current in |

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| | | First aid, pole top rescue and other related work procedures according to requirements. |
| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.12 | Road signs, barriers and warning devices are positioned in accordance with requirements. |
| 2. Carry out installation and maintenance of LV overhead services and associated equipment | 2.1 | OHS and Sustainable Energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working aloft, and use of power tools/ equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Apply essential knowledge and associated skills in the safe installation and maintenance of LV overhead services and associated equipment to ensure completion to quality standards with a minimum of waste according to requirements. |
| | 2.4 | LV overhead services and associated equipment are installed according to the work schedule and requirements/established procedures. |
| | 2.5 | Maintenance, including repair and/or replacement of LV overhead services and associated equipment is carried out, in accordance with the work schedule and requirements/established procedures. |
| | 2.6 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.7 | Unplanned events during the installation and maintenance of LV services and associated equipment are undertaken within the scope of established procedures. |
| | 2.8 | Known solutions to a variety of problems are applied using acquired essential knowledge and associated |

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| | skills.<br>2.9 On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the installation and maintenance of LV overhead services and associated equipment | 3.1 Work undertaken is checked/ tested against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.<br>3.5 Relevant work permit(s) are signed off and, the LV overhead services and associated equipment are returned to service in accordance with requirements.<br>3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
|---|---|
| This shall/may be demonstrated in relation to: | • the installation and maintenance of overhead low voltage services as they relate to distribution circuits and<br>• associated equipment and includes the identification of faults |
| Installation may include: | • the erection and connection of service lines,<br>• the fitting and connection of pole fuses or circuit breakers and the testing and<br>• commissioning of the service |
| Maintenance may include: | • the identification and diagnosis of faults,<br>• the removal, replacement or repair of service lines and associated hardware,<br>• the temporary installation of services<br>• associated equipment and the testing and<br>• commissioning of the service |
| Testing procedures may include: | • continuity<br>• polarity<br>• phase rotation |

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| | • insulation resistance and voltage |
| Testing equipment may include: | • digital/analogue voltage testers<br>• multi meters<br>• phase rotation testers<br>• load testers<br>• insulation resistance and<br>• continuity testers |
| Associated hardware may include: | • pole fuse units<br>• circuit breakers<br>• contactors<br>• mains connection boxes |
| The following constants and variables included in the Range Statement of this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification.<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance systems |

| Evidence Guide | |
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| Critical Aspects Of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Power line distribution installation<br>• Power line installation safety<br>• Low voltage electrical overhead service installation |
| Underpinning Skills | Demonstrates skills to:<br>• Power line distribution installation<br>• Power line installation safety<br>• Low voltage electrical overhead service installation |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Install, Replace and Inspect Single and 3 Phase Energy Meters and Associated Equipments** |
| **Unit Code** | **EIS TDM2 17 0612** |
| **Unit Descriptor** | This unit covers the installation and/or replacement of low voltage CT metering for measurement of energy use by consumers under choice of supplier arrangement. It encompasses working safely and to installation and set up standards, evaluating the integrity of metering wiring and earthing systems, fixing metering, making power and communication connections, setting meter parameters and completing the necessary documentation. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare to install or replace CT energy metering. | 1.1 OHS procedures for a given work area are identified, obtained and understood.<br>1.2 Health and safety risks are identified and established risk control measures and procedures in preparation for the work are followed.<br>1.3 Safety hazards that have not previously been identified are noted and established risk control measures are implemented. (Note 1: Examples of hazards likely to be encountered are asbestos reinforced switchboard panels, deteriorating switchgear and cabling and location of the switchboard.)<br>1.4 Switchboard on which the meter(s)/CTs is/are to be installed is inspected and evaluated for compliance with safety and functionality standards. (Note 2: Safety and functionality standards include the clear identification of switchboard components and their function, sound electrical insulation of wiring and components, sound MEN and main earth connections, fire integrity and access.)<br>1.5 Approval to rectify safety and/or functionality defects of the switchboard is sought from person of higher authority in accordance with established procedures.<br>1.6 Installation of the meter and rectification work is prepared in consultation with others affected by the work and sequenced appropriately.<br>1.7 Material needed for the work is obtained in accordance with established procedures and checked against job requirements. |

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| | 1.8 | Tools, equipment and testing devices needed to for the work are obtained in accordance with established procedures and checked for correct operation and safety. |
| 2. Install or replace CT metering. | 2.1 | OHS risk control measures and procedures for carrying out the work are followed. |
| | 2.2 | The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures. |
| | 2.3 | Existing metering is checked as being isolated in strict accordance OHS requirements and procedures. |
| | 2.4 | Approved rectification work is carried out to comply with standards and in accordance with established procedures. |
| | 2.5 | Meters and CTs are installed/ replaced to comply with technical standards and job specifications and requirements. |
| | 2.6 | Metering power and communication connections (where necessary) are made in accordance with manufacturer's specifications and functional and regulatory requirements. |
| | 2.7 | Meter operating parameters are set in accordance with manufacturer's specifications and functional and regulatory requirements. |
| | 2.8 | Unexpected situations are dealt with safely and with the approval of an authorized person |
| | 2.9 | Ongoing checks of the quality of installed apparatus are undertaken in accordance with established procedures. |
| | 2.10 | Metering/CT installation is carried out efficiently without unnecessary waste of materials or damage to apparatus, circuits, the surrounding environment or services and using sustainable energy principles. |
| 3. Complete and report metering installation activities. | 3.1 | OHS work completion risk control measures and procedures are followed and supply is reinstated to the installation. |
| | 3.2 | Work site is cleaned and made safe in accordance with established procedures. |
| | 3.3 | Final checks are made to that the installed metering and CTs conform to requirements. |
| | 3.4 | 'As-installed' metering and CTs and rectification work is |

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| | documented and appropriate persons notified in accordance with established procedures. |

| Variable | Range |
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| This unit shall be demonstrated in relation to the installation of at least : | • low voltage CT installation using single phase meters<br>• low voltage CT installation using a poly phase meter<br>• metering installation where compliance rectification work is required |

| Evidence Guide | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures<br>• Demonstrate consistent performance across a representative range of contexts from the prescribed items below:<br>  • Install /replace low voltage CT metering and including:<br>  • Inspecting and evaluating safety and functionality compliance of the switchboard accurately.<br>  • Following established procedures to obtain approval to rectify non-compliance aspects of the switchboard.<br>  • Carrying out preparation work effectively.<br>  • Rectifying compliance defects.<br>  • Placing and securing metering correctly.<br>  • Making power and communications connections in accordance with manufacture's specifications and functional and regulatory requirements.<br>  • Setting meter parameters in accordance with manufacture's specifications and functional and regulatory requirements.<br>  • Reinstating supply to the installation safely.<br>  • Documenting CT metering and rectification work and notifying appropriate persons in accordance with established procedures.<br>  • Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions. |

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| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• low voltage CT installation using single phase meters<br>• voltage low CT installation using a poly phase meter<br>• metering installation where compliance rectification work is required |
| Underpinning Skills | Demonstrates skills to:<br>• low voltage CT installation using single phase meters<br>• low voltage CT installation using a poly phase meter<br>• metering installation where compliance rectification work is required |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Install and Maintain Overhead Conductors and Cables (Towers)** |
| **Unit Code** | **EIS TDM2 18 0612** |
| **Unit Descriptor** | This covers the installation and maintenance of overhead conductors and cables used on towers which includes the stringing, tensioning and terminating of the conductor/cable while de energized, securing of the conductor to the insulators or supports and the undertaking of the electrical connections. It also covers maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the completion of other enterprise tests. It also encompasses confirming isolation of systems and circuits, and/accepting/ issuing electrical permits and the updating of system data/ maintenance records. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the installation and maintenance of overhead conductors and cables used on towers | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists are received/ sourced, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the ***installation*** and ***maintenance*** of overhead ***conductors*** and cables used on towers are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order. |

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| | 1.8 | Relevant personnel at work site are confirmed current in First Aid, Rescue and other related procedures according to requirements. |
| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, environment and individuals in accordance with established procedures. |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.12 | Traffic management plan is identified and implemented. |
| 2. Carry out installation and maintenance of overhead conductors and cables used on towers | 2.1 | OHS, Sustainable Energy and Environmental principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power ***tools/equipment***, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements /permits and established procedures. |
| | 2.4 | Apply Essential Knowledge and Associated Skills in the safe installation and maintenance of overhead conductors and cables used on towers to ensure completion in an agreed timeframe to quality standards with a minimum of waste according to requirements. |
| | 2.5 | Overhead conductor/cables are strung, tensioned and terminated as per requirements/established procedures. |
| | 2.6 | Conductors and anti-vibration devices, spaces/spreaders are secured as per established procedures. |
| | 2.7 | Electrical connections are made in accordance with the requirements/established procedures. |
| | 2.8 | Maintenance, including repair and/or replacement of overhead conductors and cables used on towers is carried out, in accordance with the work schedule and |

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| | requirements/established procedures.<br>2.9 Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures.<br>2.10 Unplanned events in the installation and maintenance of overhead conductors and cables used on towers are undertaken within the scope of established procedures.<br>2.11 Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills<br>2.12 On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the installation and maintenance of overhead conductors and cables used on towers | 3.1 Work undertaken is checked against works schedule for confirmation of phasing and conformance with requirements and, anomalies reported in accordance with established procedures.<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, equipment and any surplus resources and ***materials*** are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures.<br>3.5 Relevant work permit(s) are signed off and, overhead conductors and cables used on towers are returned to service in accordance with requirements.<br>3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to: | • the installation and maintenance of overhead conductor and or cables used on transmission towers |
| Installation and maintenance may include : | • the stringing,<br>• tensioning,<br>• terminating, |

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| | • removal,<br>• repairing and replacement of the conductors/cables<br>• Visual inspections and<br>• the diagnosing of faults are also included |
| Structures include: | • towers and columns |
| Types of conductor include: | • copper<br>• aluminum<br>• steel and composites<br>• Conductor configurations may be single or bundled and include pilot cables<br>• Overhead conductors include earthing systems |
| Plant may include: | • elevating work platform,<br>• winches and capstans,<br>• specialist tension stringing equipment,<br>• cable trailers,<br>• cable drum stands and<br>• equip potential equipment |
| Testing and recording equipment includes: | • insulation resistance testers,<br>• recording meters and other approved devices and<br>• techniques applicable to the voltage |
| The following constants and variables included in the this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices and OHS issues<br>• Permits and/or permits to work |

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| | • Personnel<br>• Quality assurance systems<br>• Requirements.<br>• Testing procedures<br>• Work clearance systems |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Routine maintenance on transmission structures<br>• Installation and maintenance on transmission lines and associated equipment<br>• Power line transmission installation safety |
| Underpinning Skills | Demonstrates skills to:<br>• Routine maintenance on transmission structures<br>• Installation and maintenance on transmission lines and associated equipment<br>• Power line transmission installation safety |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Inspect Overhead Structures and Electrical Apparatus (Towers)** |
| **Unit Code** | **EIS TDM2 19 0612** |
| **Unit Descriptor** | This covers the inspection as per requirements of overhead structures such as towers and electrical apparatus. Overhead structures include towers and overhead conductors and or cables include, underground and overhead transition points, electrical equipment, hardware and or earthing systems. It also includes the completion of inspection reports and other relevant documentation in accordance with requirements. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the inspection of overhead structures and electrical apparatus used on towers | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the ***inspection*** of overhead structures and ***electrical apparatus*** used on towers are obtained and understood for the purposes of the work to be performed.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and obtained and, in working order.<br>1.8 Relevant personnel at work site are confirmed current in First Aid, Pole Top Rescue and other related work |

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| | | procedures according to requirements. |
| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work. |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.12 | Traffic management plan is identified and implemented |
| 2. Carry out inspection of overhead structures and electrical apparatus used on towers | 2.1 | OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Apply essential knowledge and associated skills in the safe inspection of overhead structures and electrical apparatus used on towers to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
| | 2.4 | Inspection of overhead structures and electrical apparatus used on towers is carried out, in accordance with the work schedule and requirements/established procedures. |
| | 2.5 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.6 | Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills |
| | 2.7 | On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |

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| 3. Complete the inspection of overhead structures and electrical apparatus used on towers | 3.1 Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures.<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures.<br>3.5 Relevant work permit(s) are signed off and, overhead structures and electrical apparatus used on towers are returned to service in accordance with requirements.<br>3.6 Works completion records, reports, as installed / modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to: | • the inspection of overhead structures such as towers and electrical apparatus and equipment |
| Inspection may be carried out: | • on foot, and/or by conventional ground-based vehicle, or<br>• From the air. Aircraft may be helicopters or fixed-wing types |
| Inspection techniques include: | • use of X-ray and infrared camera |
| Items to be inspected may include: | • towers but not overhead poles and or structures |
| Types of electrical apparatus to be inspected include: | • overhead conductors,<br>• cables,<br>• hardware and footings,<br>• underground cables and overhead transition points and,<br>• electrical equipment such as pole-mounted transformers and air-break switches,<br>• hardware and or<br>• earthing systems |
| The following constants and variables included in the Range Statement | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk |

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| of this unit: | • Assessment<br>• Authorization<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance system |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Transmission structures and hardware<br>• Towers and structures inspection principles<br>• Transmission Power line inspection principles |
| Underpinning Skills | Demonstrates skills to:<br>• Transmission structures and hardware<br>• Towers and structures inspection practices<br>• Transmission Power line inspection practices |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to |

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| | information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Inspect Overhead Structures and Electrical Apparatus (Poles and Structures)** |
| **Unit Code** | **EIS TDM2 20 0612** |
| **Unit Descriptor** | This Unit covers the inspection as per requirements of overhead structures such as poles and/or other structures other than towers. It also includes inspection of electrical apparatus such as, overhead conductors and or cables, underground and overhead transition points, electrical equipment, such as pole-mounted transformers, switchgear, hardware and or earthing systems. It encompasses the completion of inspection reports and other relevant documentation in accordance with requirements. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the inspection of overhead structures and electrical apparatus used on poles and/or structures | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection. Prepare for the inspection of overhead structures and electrical apparatus used on poles and/or structures<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the ***inspection*** of overhead structures and ***electrical apparatus*** used on poles and/or structures are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Work is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.5 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are |

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| | | obtained and confirmed in working order. |
| | 1.8 | Relevant personnel at worksite are confirmed current in First Aid, Pole Top Rescue and other related work procedures according to requirements. |
| | 1.9 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.10 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.11 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.12 | Traffic management plan is identified and implemented. |
| 2. Carryout inspection of overhead structures and electrical apparatus used on poles and/or structures | 2.1 | OHS, sustainable energy and environmental principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Apply essential knowledge and associated skills in the safe inspection of overhead structures and electrical apparatus used on poles and/or structures to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
| | 2.4 | Inspection of overhead structures and electrical apparatus used on poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures. |
| | 2.5 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.6 | Unplanned events during the inspection of overhead structures and electrical apparatus used on poles and/or structures are undertaken within the scope of established procedures. |
| | 2.7 | Known solutions to a variety of problems are applied |

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| | using acquired essential knowledge and associated skills<br>2.8 On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the inspection of overhead structures and electrical apparatus used on poles and/or structures | 3.1 Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.<br>3.2 Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.<br>3.3 Work site is rehabilitated, cleaned up and made safe in accordance with established procedures.<br>3.4 Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures.<br>3.5 Relevant work permit(s) are signed off and, overhead structures and electrical apparatus used on poles and/or structures are returned to service in accordance with requirements.<br>3.6 Works completion records, reports, as installed /modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to: | • The inspection of overhead structures such as poles and/or other structures other than towers and electrical apparatus and equipment. |
| Inspection may be carried out: | • on foot,<br>• and/or by conventional ground-based vehicle, or<br>• From the air. Aircraft may be helicopters or fixed-wing types |
| Inspection techniques include: | • use of X-ray and infrared camera |
| Items to be inspected may include | • overhead poles and or structures, but not towers |
| Types of electrical apparatus to be inspected include: | • overhead conductors and cables,<br>• underground cables and overhead transition points and,<br>• electrical equipment such as pole mounted transformers |

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| | and air-break switches, hardware, such as insulators, surge arrestors and<br>• Cross-arms and or earthing systems |
| The following constants and variables included in the Range Statement of this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel.<br>• Quality assurance systems<br>• Requirements<br>• Testing procedures<br>• Work clearance systems |

| **Evidence Guide** | |
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| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |

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| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Poles and structures inspection principles<br>• Power line inspection principles |
| Underpinning Skills | Demonstrates skills to:<br>• Poles and structures inspection<br>• Power line inspection |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
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| **Unit Title** | **Maintain Overhead Energized LV Conductors and Cables** |
| **Unit Code** | **EIS TDM2 21 0612** |
| **Unit Descriptor** | This covers the maintenance of overhead energized low voltage conductors and cables and includes the verification of the site conditions and the potential hazards, the confirmation and calculation of energy flow, including an understanding of the effects of traffic loads and de- rating of circuits. It also encompasses the selection of appropriate and authorized work method using specialized equipment, the diagnosis of faults, the undertaking of electrical tests and the updating of system data/maintenance records. |

| Elements | Performance Criteria |
|---|---|
| 1. Prepare for the maintenance of overhead energized LV conductors and cables. | 1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analyzed and confirmed, if necessary, by site inspection.<br>1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.<br>1.3 OHS policies and procedures related to requirements and established procedures for the ***maintenance*** of overhead energized LV conductors and cables are obtained and confirmed for the purposes of the work to be performed and communicated.<br>1.4 Physical loads and calculations are confirmed according to requirements, using essential knowledge and appropriate skill.<br>1.5 ***Work*** is prioritized and sequenced following consultation with others for completion within acceptable timeframes and in accordance with established procedures.<br>1.6 Hazards are identified; OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear according to established procedures.<br>1.7 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.<br>1.8 Resources including personnel, equipment, tools and |

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| | | personal protective equipment required for the job are obtained and confirmed in working order. |
| | 1.9 | Specialist equipment for live working is inspected and confined in working order as per requirements and established procedures. |
| | 1.10 | Relevant personnel at worksite are confirmed current in First Aid, Pole Top Rescue and other related work procedures according to requirements. |
| | 1.11 | Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved to carry out work where necessary. |
| | 1.12 | Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures. |
| | 1.13 | Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures. |
| | 1.14 | Traffic management plan is identified and implemented. |
| 2. Carry out maintenance of overhead energized LV conductors and cables. | 2.1 | Environmental principles and practices to reduce the incidents of accidents and minimize waste are monitored and followed in accordance with requirements and/or established procedures. |
| | 2.2 | Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely followed and, currency according to requirements confirmed. |
| | 2.3 | Apply essential knowledge and associated skills in the safe maintenance of overhead energized LV conductors and cables to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. |
| | 2.4 | Maintenance, including repair and/or replacement of poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures. |
| | 2.5 | Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are reported to the immediate authorized persons for directions according to established procedures. |
| | 2.6 | Unplanned events in the maintenance of overhead energized LV conductors and cables are undertaken within the scope of established procedures. |

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| | 2.7 | Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills |
| | 2.2 | On going checks of quality of the work are undertaken in accordance with instructions and established procedures. |
| 3. Complete the maintenance of overhead energized LV conductors and cables. | 3.1 | Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures. |
| | 3.2 | Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable. |
| | 3.3 | Work site is rehabilitated, cleaned up and made safe in accordance with established procedures. |
| | 3.4 | Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage or disposed of in accordance with established procedures. |
| | 3.5 | Relevant work permit(s) are signed off and, overhead energized LV conductors and cables are returned to service in accordance with requirements. |
| | 3.6 | Works completion records, reports, as installed / modified drawing and/or documentation and information are finalized and processed and appropriate personnel notified. |

| **Variable** | **Range** |
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| This shall/may be demonstrated in relation to: | • the maintenance of overhead energized low voltage conductors and cables taking into account the potential hazards,<br>• the calculation of physical loads,<br>• including an understanding of the effects of traffic loads and de-rating of circuits |
| Maintenance may include: | • the removal,<br>• repair and replacement of cables,<br>• conductors and<br>• associated hardware |
| Structures include: | • poles, and columns |
| Work methods require: | • the use of insulating gloves and specialized live working equipment and tools |

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| Work may be performed: | • from elevating work platform,<br>• ladder,<br>• portable pole platform, or<br>• the ground |
| Testing and recording devices include: | • voltage detectors,<br>• tong ammeters,<br>• polarity testers,<br>• recording meters and phase sequence indicators |
| Specialized live working equipment includes: | • insulating mats and sleeves, insulating gloves,<br>• temporary bridges/hoppers,<br>• insulated cable tensioning devices and ladder/pole shrouds and<br>• equipotential bonding |
| The following constants and variables included in the Range Statement of this unit: | • Appropriate and relevant persons (see Personnel)<br>• Appropriate authorities<br>• Appropriate work platform<br>• Assessing risk<br>• Assessment<br>• Authorization<br>• Confined space<br>• Diagnostic, testing and restoration<br>• Documenting detail work events, record keeping and or storage of information<br>• Drawings and specifications<br>• Emergency<br>• Environmental and sustainable energy procedures<br>• Environmental legislation<br>• Environmental management documentation<br>• Established procedures<br>• Fall prevention<br>• Hazards<br>• Identifying hazards<br>• Inspect<br>• Legislation<br>• MSDS<br>• Notification<br>• OHS practices<br>• OHS issues<br>• Permits and/or permits to work<br>• Personnel<br>• Quality assurance systems<br>• Requirements.<br>• Testing procedures<br>• Work clearance systems |

| Evidence Guide | |
|---|---|
| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures<br>• Apply sustainable energy principles and practices<br>• Conduct work observing the relevant legislation, regulations, polices and workplace procedures |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Low voltage - energized working practices for substations.<br>• Low voltage switching principles |
| Underpinning Skills | Demonstrates skills to:<br>• working practices for substations<br>• Low voltage - energized Power line safety practices.<br>• Low voltage switching principles<br>• Power line safety practices |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation / Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
|---|---|
| **Unit Title** | **Work in Team Environment** |
| **Unit Code** | **EIS TDM2 22 0612** |
| **Unit Descriptor** | This unit of competence covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team. |

| **Elements** | **Performance Criteria** |
|---|---|
| 1. Describe team role and scope | 1.1 The ***role and objective of the team*** is identified from available ***sources of information.***<br>1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources. |
| 2. Identify own role and responsibility within team | 2.1 Individual role and responsibilities within the team environment are identified.<br>2.2 Roles and responsibility of other team members are identified and recognized.<br>2.3 Reporting relationships within team and external to team are identified. |
| 3. Work as a team member | 3.1 Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives.<br>3.2 Effective and appropriate contributions made to complement team activities and objectives, based on individual skills and competencies and ***workplace context.***<br>3.3 Observed protocols in reporting using standard operating procedures.<br>3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members. |

| **Variable** | **Range** |
|---|---|
| Role and objective of team | • Work activities in a team environment with enterprise or specific sector<br>• Limited discretion, initiative and judgment maybe demonstrated on the job, either individually or in a team environment |

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|---|---|
| Sources of information | • Standard operating and/or other workplace procedures<br>• Job procedures<br>• Machine/equipment manufacturer's specifications and instructions<br>• Organizational or external personnel<br>• Client/supplier instructions<br>• Quality standards<br>• OHS and environmental standards |
| Workplace context | • Work procedures and practices<br>• Conditions of work environments<br>• Legislation and industrial agreements<br>• Standard work practice including the storage, safe handling and disposal of chemicals<br>• Safety, environmental, housekeeping and quality guidelines |

| **Evidence Guide** | |
|---|---|
| Critical Aspects of competence | Assessment requires evidence that the candidate:<br>• Operated in a team to complete workplace activity<br>• Worked effectively with others<br>• Conveyed information in written or oral form<br>• Selected and used appropriate workplace language<br>• Followed designated work plan for the job<br>• Reported outcomes |
| Underpinning Knowledge and Attitude | Demonstrates knowledge of:<br>• Communication process<br>• Team structure<br>• Team roles<br>• Group planning and decision making |
| Underpinning Skills | Demonstrates skills to:<br>• Communicate appropriately, consistent with the culture of the workplace |
| Resource Implications | The following resources must be provided:<br>• Access to relevant workplace or appropriately simulated environment where assessment can take place |
| Methods of Assessment | Competence may be assessed through:<br>• Interview/ Written Test<br>• Observation/Demonstration with Oral Questioning |
| Context for Assessment | Competence may be assessed in workplace or in a simulated workplace setting. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
|---|---|
| **Unit Title** | **Participate in Workplace Communication** |
| **Unit Code** | **EIS TDM2 23 0612** |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements. |

| **Elements** | **Performance Criteria** |
|---|---|
| 1. Obtain and convey workplace information | 1.1 Specific and relevant information is accessed from ***appropriate sources*** |
| | 1.2 Effective questioning , active listening and speaking skills are used to gather and convey information |
| | 1.3 Appropriate ***medium*** is used to transfer information and ideas |
| | 1.4 Appropriate non- verbal communication is used |
| | 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed |
| | 1.6 Defined workplace procedures for the location and ***storage*** of information are used |
| | 1.7 Personal interaction is carried out clearly and concisely |
| 2. Participate in workplace meetings and discussions | 2.1 Team meetings are attended on time |
| | 2.2 Own opinions are clearly expressed and those of others are listened to without interruption |
| | *2.3* Meeting inputs are consistent with the meeting purpose and established ***protocols*** |
| | 2.4 ***Workplace interactions*** are conducted in a courteous manner |
| | 2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to. |
| | 2.6 Meetings outcomes are interpreted and implemented |
| 3. Complete relevant work related documents | 3.1 Range of ***forms*** relating to conditions of employment are completed accurately and legibly |
| | 3.2 Workplace data is recorded on standard workplace forms and documents |
| | 3.3 Basic mathematical processes are used for routine calculations |

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|---|---|
| | 3.4 Errors in recording information on forms/ documents are identified and properly acted upon<br>3.5 Reporting requirements to supervisor are completed according to organizational guidelines |

| **Variable** | **Range** |
|---|---|
| Appropriate sources | • Team members<br>• Suppliers<br>• Trade personnel<br>• Local government<br>• Industry bodies |
| Medium | • Memorandum<br>• Circular<br>• Notice<br>• Information discussion<br>• Follow-up or verbal instructions<br>• Face to face communication |
| Storage | • Manual filing system<br>• Computer-based filing system |
| Forms | • Personnel forms, safety reports |
| Workplace interactions | • Face to face<br>• Telephone<br>• Electronic and two way radio<br>• Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams |
| Protocols | • Observing meeting<br>• Compliance with meeting decisions<br>• Obeying meeting instructions |

| **Evidence Guide** | |
|---|---|
| Critical Aspects of Competence | Assessment requires evidence that the candidate:<br>• Prepared written communication following standard format of the organization<br>• Accessed information using communication equipment<br>• Made use of relevant terms as an aid to transfer information effectively<br>• Conveyed information effectively adopting the formal or informal communication |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:<br>• Effective communication<br>• Different modes of communication<br>• Written communication<br>• Organizational policies |

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|---|---|
| | • Communication procedures and systems<br>• Technology relevant to the enterprise and the individual's work responsibilities |
| Underpinning Skills | Demonstrates skills to:<br>• Follow simple spoken language<br>• Perform routine workplace duties following simple written notices<br>• Participate in workplace meetings and discussions<br>• Complete work related documents<br>• Estimate, calculate and record routine workplace measures<br>• Basic mathematical processes of addition, subtraction, division and multiplication<br>• Ability to relate to people of social range in the workplace<br>• Gather and provide information in response to workplace Requirements |
| Resource Implications | The following resources must be provided:<br>• Fax machine<br>• Telephone<br>• Writing materials<br>• Internet |
| Methods of Assessment | Competence may be assessed through:<br>• Interview/Written Test<br>• Observation/Demonstration with Oral Questioning |
| Context of Assessment | Competence may be assessed individually in the actual workplace or through accredited institution. |

| Occupational Standard: Power Transmission, Distribution, Inspection and Maintenance Level II | |
|---|---|
| **Unit Title** | **Develop Business Practice** |
| **Unit Code** | **EIS TDM2 24 0612** |
| **Unit Descriptor** | This unit of competence specifies the outcomes required to establish a business operation from a planned concept. It includes researching the feasibility of establishing a business operation, planning the setting up of the business, implementing the plan and reviewing operations once commenced. |

| Elements | Performance Criteria |
|---|---|
| 1. Identify business opportunity | 1.1 ***Business opportunities*** are investigated and identified<br>1.2 Feasibility study is undertaken to determine likely ***business viability***<br>1.3 Market research on product or service is undertaken<br>1.4 Assistance with feasibility study of ***specialist and relevant parties*** is sought as required<br>1.5 Impact of emerging or changing technology including e-commerce, on business operations are evaluated<br>1.6 Practicability of business opportunity assessed in line with perceived risks, returns sought and resources available<br>1.7 Business plan for operation is completed |
| 2. Identify personal business skills | 2.1 Financial and business skills available are identified and taken into account when business opportunities are researched<br>2.2 ***Personal skills/attributes*** are assessed and matched against those perceived as necessary for a particular business opportunity<br>2.3 ***Business risks*** are identified and assessed according to resources available and personal preferences |
| 3. Plan for establishment of business operation | 3.1 Business structure and operations are determined and documented<br>3.2 Procedures to guide operations are developed and documented<br>3.3 Financial backing for business operation is secured<br>3.4 Business legal and regulatory requirements are identified and complied |

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|---|---|---|
| | 3.5 | ***Human and physical resources*** required to commence business operation are determined |
| | 3.6 | Recruitment strategies are developed and implemented |
| 4. Implement establishment plan | 4.1 | Marketing of business operation is undertaken |
| | 4.2 | Physical and human resources to implement business operation are obtained |
| | 4.3 | ***Operational unit*** to support and coordinate business operation is established |
| | 4.4 | Monitoring process for managing operation is developed and implemented |
| | 4.5 | ***Legal documents*** are carefully maintained and relevant records are kept and updated to ensure validity and accessibility |
| | 4.6 | Contractual procurement rights for goods and services including ***contracts with relevant people****,* negotiated and secured as required in accordance with the business plan |
| | 4.7 | Options for leasing/ownership of business premises identified and contractual arrangements completed in accordance with the business plan |
| 5. Review implementation process | 5.1 | Review process for implementation of business operation is developed and implemented |
| | 5.2 | Improvements in business operation and associated management process are identified |
| | 5.3 | Identified improvements are implemented and monitored for effectiveness |
| | 5.4 | Necessary documentation is completed and records organized and kept securely. |

| **Variable** | **Range** |
|---|---|
| Business opportunities maybe influenced by: | • expected financial viability<br>• skills of operator<br>• amount and types of finance available<br>• returns expected or required by owners<br>• likely return on investment<br>• finance required<br>• lifestyle issues |
| Business viability may include: | • opportunities available<br>• market competition<br>• timing/ cyclical considerations<br>• skills available |

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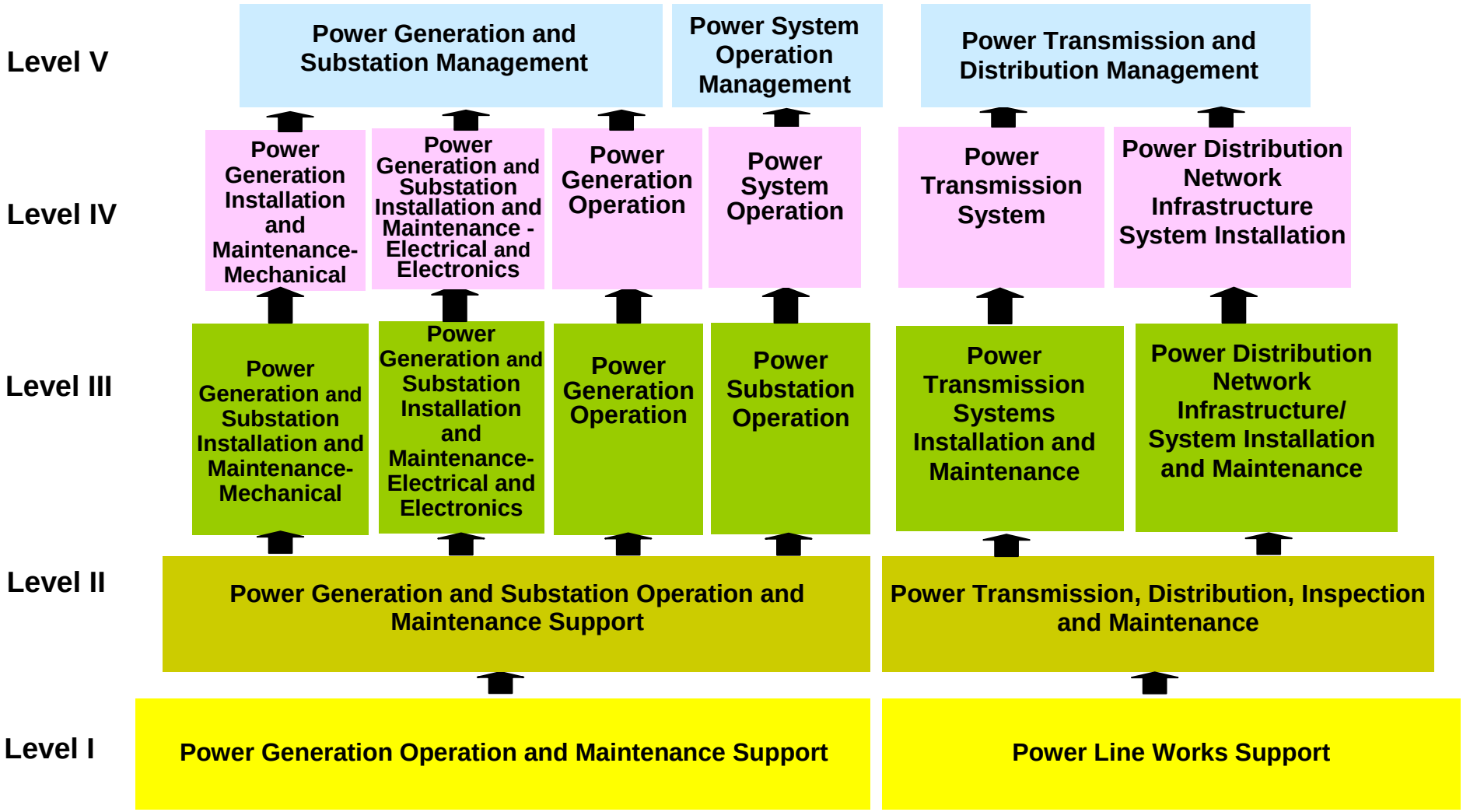
|---|---|
| | • resources available<br>• location and/ or premises available<br>• risk related to a particular business opportunity, especially<br>• in regard to Occupational Health and Safety and<br>• environmental considerations |
| Specialist and relevant parties | • Chamber of commerce<br>• Financial planners and financial institution representatives, business planning specialists and marketing specialists<br>• accountants<br>• lawyers and providers of legal advice<br>• government agencies<br>• industry/trade associations<br>• online gateways<br>• business brokers/business consultants |
| Human and physical resources may include: | • software and hardware<br>• office premises<br>• communications equipment<br>• specialist services through outsourcing, contracting and<br>• consultancy<br>• staff<br>• vehicles |
| Personal skills/attributes may include: | • technical and/ or specialist skills<br>• business knowledge and skills<br>• entrepreneurship<br>• willingness to take risks |
| Business risks may be affected by and may include but are not restricted to: | • occupational health and safety and environmental<br>• considerations<br>• relevant legislative requirements<br>• security of investment<br>• market competition<br>• security of premises/ location<br>• supply and demand<br>• resources available |
| Resources may include: | • staff<br>• money<br>• time<br>• equipment<br>• space |
| Operational unit refers to: | • office location staffed with required personnel and equipped to service and support business<br>• home-based site or other location such as leased or owned property |
| Legal documents may include: | • partnership agreements, constitution documents, statutory books for companies (Register of Members, Register of Directors and Minute Books), Certificate of Incorporation, |

| | |
|---|---|
| | Franchise Agreements and financial documentation, appropriate software for financial records<br>• recordkeeping including personnel, financial, taxation, OHS and environmental |
| Contracts with relevant people may include: | • owners, suppliers, employees, landlords, agents, distributors, customers or any person with whom the business has, or seeks to have, a performance-based relationship |

| **Evidence Guide** | |
|---|---|
| Critical Aspects of Competence | A person must be able to provide evidence:<br>• that a business operation has been planned and implemented from initial research into feasibility of the business and completion of the plan, through to implementing the plan and commencing operations<br>• the ability to evaluate the results of research and assess the likely viability and practicability of a business opportunity, taking into account the current business/market climate and resources available |
| Underpinning Knowledge and Attitudes | Demonstrate knowledge on:<br>• Federal and regional government legislative requirements affecting business operations, especially in regard to occupational health and safety (OHS), equal employment opportunity (EEO), industrial relations and anti-discrimination<br>• Technical or specialist skills relevant to the business operation<br>• Financing options<br>• Business systems and operations<br>• Relevant marketing, management, sales and financial concepts<br>• Methods for researching business opportunities<br>• Principles of risk management relevant to the business<br>• Methods of identifying relevant specialist services to complement the business<br>• Forms and administrative systems<br>• Services available and charges<br>• Planning and control systems (sales,<br>• Advertising and promotion, distribution and logistics<br>• Financial recording systems<br>• Legal rights and responsibilities<br>• Record keeping duties<br>• Operational factors relating to the business (provision of professional services, products) |
| Underpinning Skills | Demonstrate skills of:<br>• Literacy skills to interpret legal requirements, company policies and procedures and immediate, day-to-day demands<br>• Marketing skills |

| | |
|---|---|
| | • Business planning skills<br>• Entrepreneurial skills<br>• Problem-solving skills<br>• OHS skills<br>• Time management skills<br>• Belief in services and products offered by the business<br>• Communication skills including questioning, clarifying, reporting, and giving and receiving constructive feedback<br>• Technical and analytical skills to interpret business documents, reports and financial statements and projections<br>• Ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities<br>• Problem solving skills to develop contingency plans<br>• Using computers and software packages to record and manage data and to produce reports<br>• Literacy skills to enable interpretation of business information, numeracy skills for data analysis to aid research<br>• Research skills to identify a business opportunity and to conduct a feasibility study<br>• Analytical skills to assess personal attributes and to identify business risks<br>• Observation skills for identifying appropriate people, resources and to monitor work |
| Resource Implications | The following resources should be provided:<br>• Access to relevant workplace documentation, financial records, and equipment |
| Methods of Assessment | Competence may be assessed through:<br>• Interview / Written Test<br>• Observation/Demonstration with Oral questioning |
| Context for Assessment | Competence may be assessed in the workplace or in a simulated work environment. |

**Sector: Economic Infrastructure**
**Sub-Sector: Power Generation, Transmission and Distribution**



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