Federal Democratic Republic of Ethiopia

OCCUPATIONAL STANDARD

POWER TRANSMISSION AND DISTRIBUTION MANAGEMENT

NTQF Level V

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 and Distribution Management

Occupational Code: EIS TDM

NTQF Level V

EIS TDM5 01 0612 Manage Environmental Performance	EIS TDM5 02 0612 Use Engineering Application Software	EIS TDM5 03 0612 Solve Problems in Electromagnetic Circuits
EIS TDM5 04 0612 Provide Computational Solutions to Power Engineering Problems	EIS TDM5 05 0612 Solve Problems in Complex Multiple Path Power Circuits	EIS TDM5 06 0612 Solve Problems in Complex Poly Phase Power Circuits
EIS TDM5 07 0612 Solve Problems in D.C. Power Supplies with Single Phase Input	EIS TDM5 08 0612 Solve Problems in Digital Components of Electronic Apparatus	EIS TDM5 09 0612 Manage Electricity Supply Industry OHS Management System
EIS TDM5 10 0612 Coordinate and Direct Switching Schedules	EIS TDM5 11 0612 Coordinate Vegetation Control Work	EIS TDM5 12 0612 Develop Planned Outage Strategies
EIS TDM5 13 0612 Establish and Manage Geographical Information Systems Data	EIS TDM5 14 0612 Coordinate LV Distribution Network Demand	EIS TDM5 15 0612 Coordinate HV Transmission and Sub-Transmission Networks
EIS TDM5 16 0612 Maintain Network Protection and Control System (Interdependent)	EIS TDM5 17 0612 Manage Electrical Infrastructure Projects	EIS TDM5 18 0612 Review Asset Management Strategies

EIS TDM5 19 0612 Develop HV and LV Distribution Protection Systems	EIS TDM5 20 0612 Prepare and Manage Detailed Construction Plans for Electrical System Infrastructure	EIS TDM5 21 0612 Develop HV Switching Schedule and Program
EIS TDM5 22 0612 Coordinate Permit Procedures	EIS TDM5 23 0612 Implement and Monitor Environmental and Sustainable Energy Management Policies and Procedures	EIS TDM5 24 0612 Manage Project Quality
EIS TDM5 25 0612 Establish and Conduct Business Relationships	EIS TDM5 26 0612 Facilitate and Capitalize on Change and Innovation	EIS TDM5 27 1012 Develop and Refine Systems for Continuous Improvement in Operations

Occupational Standard: Power Transmission and Distribution Management Level V	
Unit Title	**Manage Environmental Performance**
Unit Code	**EIS TDM5 01 0612**
Unit Descriptor	This unit covers the development, maintenance and evaluation of the organization's environmental policies and procedures in regard to environmental sustainability as an integral part of business planning. All those who have a management responsibility would be advised to take this unit. It is also very useful for small businesses.

Elements	Performance Criteria
1. Develop a business plan to enhance environmental performance	1.1 A ***business*** plan is developed that reflects the organization's policies and commitment to ***environmental sustainability*** as an integral part of business operations 1.2 Procedures are developed to maximize/enhance integration of environment, finance, safety and other areas of impacts and opportunities 1.3 Procedures are developed to maximize ***environmental opportunities*** and minimize environmental impacts, and expert advice is obtained as required 1.4 Continuous improvement ***policies and practices*** monitor and report on the environmental performance of the organization 1.5 The organization's activities and products are designed to minimize life cycle impacts 1.6 Financial and human resources for the operation of environmental systems are identified, sought and/or provided as required 1.7 Changing trends and opportunities relevant to the organization are identified, analyzed and taken into account at the planning stage
2. Manage environmental impact and opportunity	2.1 Identification and assessment of existing and potential ***environmental impacts*** and opportunities is conducted and advice is sought as required 2.2 Procedures for ongoing management of environmental impacts and opportunities are developed and integrated with the organization's policies and procedures 2.3 ***Environmental procedures*** are addressed at the planning, design and evaluation stages of any change in the ***workplace*** to ensure that ongoing impacts and opportunities are identified

	2.4 Contingency plans are established to manage impacts and opportunities when long-term solutions are not readily available 2.5 Ongoing training program is developed to identify and fulfill employees' ***environmental training needs***
3. Promote innovation and opportunity	3.1 Continuous improvement and sustainable innovation are promoted as an essential part of doing business 3.2 Procedures are developed to analyze and communicate the costs and benefits of innovations and improvements 3.3 New ideas are actively sought and entrepreneurial behaviour is encouraged in employees, workplace committees and teams 3.4 Procedures are established to actively seek the support of the supply chain for implementing sustainable innovation and continuous improvement 3.5 Members of the ***supply chain*** are encouraged to meet high standards of environmental performance
4. Manage system to record and report environmental impacts and opportunities	4.1 System is managed to record and report environmental performance as an integral part of the organization's record keeping and performance evaluation system 4.2 Patterns of environmental non-compliance are identified and addressed and opportunities for ***environmental management*** improvements are acted upon
5. Evaluate environmental performance	5.1 Processes are developed to ensure that ongoing evaluation of ***environmental performance***, is part of the organization's procedures

Variable	**Range**
Business sustainability means**:**	• A sustainable business in this sense is profitable and • Competitive in the foreseeable future. Effective management of environmental impacts and opportunities can contribute to business sustainability by reducing costs, differentiating goods and services and contributing to a better corporate image.
Environmental sustainability must be relevant to the organization's operations and may include:	• recognition of natural earth systems and how natural systems work
Environmental sustainability	• organizational culture and operations • internal or external economic climate

may affected by:	• political climate • market focus/considerations
Knowledge of legislation, codes, national standards, industry codes of practice and workplace policies and procedures must:	• be strictly relevant to the particular workplace and is not intended to include detailed technical aspects of environmental science and • details of legislation must be directly relevant to the workplace • be consistent with the concept that people at this level, will be dealing with environmental concepts as part of an overall management responsibility and not as an environmental specialist
To “minimize environmental impact”, means to minimize the organizations negative effects on the environment including:	• waste minimization and recycling • emissions/spills • resource efficiency including water, energy • alternative energy sources • reduction in use of non-renewable resources
Legislation, codes and national standards relevant to the workplace which may include:	• award and enterprise agreements and relevant industrial instruments • relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination • relevant industry codes of practice
Environmental performance may be defined as:	• a measure of an organization’s impact on the environment and of their ability to manage that impact
Environmental policies may address:	• local, national and international innovations, programs and ideas • triple bottom line principles i.e. the integration of environmental, commercial and social aspects of business operations • concepts of business sustainability • environmental load reduction and waste minimization • tenders for the provision of goods and services that specify environmentally preferred selection criteria (eg. use of paper packaging rather than plastic) • protection of land and habitat and ecological considerations • procedures for media releases as a result of incidents
Environmental improvement plans may be	• measuring, monitoring and recording environmental performance, and continually setting targets for measurable improvements

established at management level and may include:	• all aspects of environmental performance including energy and other resource use, waste minimization, recycling, transport use etc
“Maximize opportunities to improve environmental performance” can provide opportunities to improve business operations including increases in:	• corporate image/citizenship • staff morale • cost reduction • product differentiation/branding • identification of market potential
Monitor and report in this context means to maximize and continually seek to improve business performance by developing procedures which monitor and report on:	• variances • deficiencies • improvements • trends
Products may include:	• goods, including packaging • services
Products may include:	• goods, including packaging • services
Life cycle impacts may include:	• tendering and purchasing processes to include life • cycle criteria • product design and manufacture • packaging policies • product use • product disposal • vehicle policies that include use of cleaner • fuels/alternative energy sources and regular servicing • intervals to reduce pollution and improve efficiency
Environmental procedures may include:	• procedures that may have an influence on the • organization’s environmental performance
Environmental management training program should be:	• integrated into the organization’s existing training arrangements

Continuous improvement and innovation means	• consistently reviewing activities in search of a better way and improving the organization in all aspects of its operation
Supply chain may include:	• suppliers • contractors • others acting on organization's behalf • supply should be identified as a key determinate of environmental performance
Recording and reporting systems may include:	• internal and external reporting requirements

Evidence Guide	
Critical Aspects of Competence	• Assessment requires evidence that the candidate able to identify, plan, manage and promote environmental sustainability within the organization and to contribute to the development of environmental management policies that minimize impacts and maximize opportunities within the organization • N.B. Particular note must be taken that evidence must be strictly relevant to the particular management role and is not intended to include detailed technical aspects of environmental science
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Understanding of a broad knowledge base incorporating theoretical concepts, with substantial depth in some areas. • Relevant legislation from all levels of government that affects business operation, especially in regard to Occupational Health and Safety and environmental issues, equal opportunity, industrial relations and anti-discrimination • Limited to that which is sufficient to perform the particular management function and is intended to promote environmental awareness rather than technical environment competencies • Relevant business planning concepts • Environment sustainability as a "whole-system" approach • Quality assurance procedures • Strategies to maximize opportunities and minimize environment impact • Relevant training and record keeping concepts • Relevant knowledge of environmental issues especially in regard to water catchments, air, noise, ecosystems, habitat, waste minimization • Relevant knowledge of ecological systems in regard to business operation

Underpinning Skills	Demonstrates skills to: • Communication/consultation skills to ensure all relevant groups and individuals are advised of what is occurring and are provided with an opportunity for input • Conflict management to mediate, negotiate and/or attempt to obtain consensus between parties • Analysis to identify potential environmental and ecological impacts and opportunities in regard to business operation • Problem solving to deal effectively with environmental impacts and opportunities as identified • Relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Use Engineering Application Software**
Unit Code	**EIS TDM5 02 0612**
Unit Descriptor	This unit covers the use of computer application relevant to engineering support work functions. It encompasses applying user preferences, using application menus and tools, entering and retrieves information, working with groups and transferring and printing files.

Elements	Performance Criteria
1. Prepare to use computer applications.	1.1 OHS procedures for a given work area are identified, obtained and understood through established routines and procedures. 1.2 Established OHS risk control measures and procedures in relation to computer and keyboard use are followed. 1.3 Application software and information required for use is obtained from appropriate sources. 1.4 On-screen instructions in relation to any anomaly such as a virus warning are followed. 1.5 Help menu is used to resolve any straightforward start up or access issues or anomalies.
2. Use engineering application software	2.1 Established OHS risk control measures and procedures for carrying out the work are followed. 2.2 Techniques that apply to a particular software package are used to produce appropriate files. 2.3 Routine checks are made to ensure accuracy of information in accordance with quality requirements.
3. Output information from an application	3.1 Completed files are stored appropriately in accordance with enterprise requirements. 3.2 Files are printed for formal records and/or forwarded to others.
4. Shut down computer	4.1 Files are named, arranged, saved and backed up in accordance with enterprise requirements. 4.2 Computer shutdown procedures are followed and computer switched off.

Variable	Range
This unit shall be demonstrated in relation to using at least two of the following types of engineering applications at a basic level.	• Office Applications • Computer Aided Design • Engineering data analysis software • Engineering modeling • Project management

Evidence Guide	

Critical Aspects of Competence	Assessment requires evidence that the candidate:
	• Implement Occupational Health and Safety workplace procedures and practices, including the use of risk control measures as specified in the performance criteria and range statement
	• Apply sustainable energy principles and practices as specified in the performance criteria and range statement
	• Use engineering applications software including:
	  • Following application instructions to input and output information.
	  • Storing information appropriately.
	  • Outputting information to a printer.
	  • Transferring information between systems.
	  • Saving, storing and backing up files for effective retrieval by others.
	  • Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items

Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Personal computers, engineering applications software basic • Occupational Health and Safety principles
Underpinning Skills	Demonstrates skills to: • Occupational Health and 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Solve Problems in Electromagnetic Circuits**
Unit Code	**EIS TDM5 03 0612**
Unit Descriptor	This unit covers determining correct operation of electromagnetic circuits and providing solutions as they apply to electrical installations and equipment. It encompasses working safely, power circuit problems solving processes, including the use of voltage, current and resistance measuring devices, providing solutions derived from measurements and calculations to predictable problems in multiple path circuit.

Elements	Performance Criteria
1. Prepare to work on electro-magnetic circuits.	1.1 OHS procedures for a given work area are obtained and understood. 1.2 OHS risk control work preparation measures and procedures are followed. 1.3 The nature of the circuit(s) problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken. 1.4 Advice is sought from the work supervisor to ensure the work is co-ordinate effectively with others. 1.5 Sources of materials that may be required for the work are established in accordance with established procedures. 1.6 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2. Solve multiple path electrical circuit problems.	2.1 OHS risk control work measures and procedures 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 Circuits are checked as being isolated where necessary in strict accordance OHS requirements and procedures. 2.4 Established methods are used to solving ***circuit problems*** from measure and calculated values as they apply to multiple path electrical circuit. 2.5 Unexpected situations are dealt with safely and with the approval of an authorized person. 2.6 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. 3.2 Work site is cleaned and made safe in accordance with established procedures. 3.3 Justification for solutions used to solve circuit problems is documented. 3.4 Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

Variable	**Range**
This unit shall be demonstrated in relation to solving problems in electromagnetic circuits by:	• determining correct operation of electromagnetic circuits • providing solutions as they apply to electrical installations and equipment
In relation to the following electromagnetic circuit problems on at least two occasions:	• solving electromagnetic circuit problems, • using voltage, current and resistance measuring devices, • providing practical uses in electromagnets, • providing solutions derived from measurements and calculations to predictable problems in electromagnetic circuits, • determining the operating parameters of an existing electromagnetic circuit, • altering an existing electromagnetic circuit to comply with specified operating parameters, • listing control measures that apply to electrical devices and machines operating at low voltage • developing circuits to comply with a specified function and operating parameters

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures • Demonstrated consistent performance across a representative range of contexts from the prescribed items below: • Solve problems in electromagnetic circuits including:

	• Determining the operating parameters of an existing electromagnetic circuit. • Providing practical uses in electromagnets. • Listing control measures that apply to electrical devices and machines operating at low voltage • Correctly and safely using voltage, current and resistance measuring devices and providing solutions derived from measurements and calculations to predictable problems in electromagnetic circuits. • Altering an existing electromagnetic circuit to comply with specified operating parameters, • Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions
Underpinning Knowledge and Attitudes	Demonstrates knowledge to: • Electromagnetic principles • Hand tools • Occupational health and safety principles
Underpinning Skills	Demonstrates skills to: • Electromagnetic • Occupational health and safety practices • Electrical safe working practice
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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Provide Computational Solutions to Power Engineering Problems**
Unit Code	**EIS TDM5 04 0612**
Unit Descriptor	This unit covers the application of computational processes to solving problems encountered in power engineering. It encompasses working safely, applying problem solving techniques, using a range of mathematical processes, providing solutions to power engineering problems and justifying such solutions.

Elements	**Performance Criteria**
1. Provide computational solutions to engineering problems	1.1 OHS procedures for a given work area are obtained and understood 1.2 The nature of the problems are obtained from documentation or from work supervisor to establish the scope of work to be undertaken 1.3 ***Power engineering problems*** are clearly stated in writing and/or diagrammatic form to ensure they are understood and appropriate methods used to resolve them. 1.4 Known constants and variable related to the problem are obtained from measured values or problem documentation. 1.5 Alternative methods for resolving the problem are considered and where necessary discussed with appropriate person(s). 1.6 Problems are solved using appropriate mathematical processes and within the realistic accuracy.
2. Complete work and document problem solving activities	2.1 Justification for solutions used to solve engineering problems is documented for inclusion in work/project development records in accordance with professional standards. 2.2 Work completion is documented and an appropriate person or persons notified.

Variable	**Range**
This unit shall be demonstrated in relation to problems that apply to power	• Electrical • Electronics • Renewable energy • Control

engineering diagnosis and development work functions in any of the following disciplines:	

Evidence Guide	

Critical Aspects of Competence	Assessment requires evidence that the candidate:
	• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures
	• Apply sustainable energy principles and practices
	• Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
	• Demonstrated performance across a representative range of contexts from the prescribed items below:
	  • Provide computational solutions to power engineering including:
	  • Clearly stating problems in written and diagrammatic form.
	  • Obtaining known constants and variable from an appropriate source.
	  • Solving problems using appropriate mathematical processes.
	  • Documenting justification of solutions provided in accordance with professional standards.

Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Power engineering computations • Occupational Health and Safety principles
Underpinning Skills	Demonstrates skills to: • 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Solve Problems in Complex Multiple Path Power Circuits**
Unit Code	**EIS TDM5 05 0612**
Unit Descriptor	This unit covers the determining correct operation of complex series-parallel power circuits and providing solutions as they apply to electrical power engineering work functions. It encompasses working safely, problem solving procedures, including electrical measuring devices, applying appropriate circuit theorems and providing solutions derive from measurements and calculations and providing justification for such solutions.

Elements	Performance Criteria
1. Provide computational solutions to engineering problems	1.1 OHS procedures for a given work area are obtained and understood 1.2 The nature of the problems are obtained from documentation or from work supervisor to establish the scope of work to be undertaken 1.3 Power engineering problems are clearly stated in writing and/or diagrammatic form to ensure they are understood and appropriate methods used to resolve them. 1.4 Known constants and variable related to the problem are obtained from measured values or problem documentation. 1.5 Alternative methods for resolving the problem are considered and where necessary discussed with appropriate person(s). 1.6 Problems are solved using appropriate mathematical processes and within the realistic accuracy.
2. Complete work and document problem solving activities	2.1 Justification for solutions used to solve engineering problems is documented for inclusion in work/project development records in accordance with professional standards. 2.2 Work completion is documented and an appropriate person or persons notified

Variable	Range
This unit shall be demonstrated in relation to:	• problems that apply to power engineering diagnosis and development work functions

Evidence Guide	

Critical Aspects of Competence	Assessment requires evidence that the candidate:
	• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures
	• Apply sustainable energy principles and practices
	• Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
	• Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
	  • Solve problems in complex multiple path power circuits including:
	  • Clearly stating problems in written and diagrammatic
	  • form
	  • Obtaining known constants and variable from an appropriate source.
	  • Solving problems using appropriate mathematical processes.
	  • Documenting justification of solutions provided in accordance with professional standards.

Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Electrical power circuit analysis • Occupational Health and Safety principles
Underpinning Skills	Demonstrates skills to: • Electrical power circuit analysis • 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Solve Problems in Complex Poly Phase Power Circuits**
Unit Code	**EIS TDM5 06 0612**
Unit Descriptor	This unit covers determining correct operation of complex poly phase power circuits and providing solutions as they apply to electrical power engineering work functions. It encompasses working safely, problem solving procedures, including using electrical measuring devices, applying appropriate circuit theorems and providing solutions derived from measurements and calculations and justification for such solutions.

Elements	Performance Criteria
1. Prepare to solve problems in complex poly phase power circuits.	1.1 OHS procedures for a given work area are identified, obtained and understood. 1.2 OHS risk control work preparation measures and procedures are followed. 1.3 The nature of the ***circuit(s) problem*** is obtained from documentation or from work supervisor to establish the scope of work to be undertaken. 1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others. 1.5 Sources of materials that may be required for the work are established in accordance with established procedures. 1.6 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2. Solve problems in complex poly phase power circuits.	2.1 OHS risk control work measures and procedures 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 Circuits are checked as being isolated where necessary in strict accordance OHS requirements and procedures. 2.4 Established methods are used to solving circuit problems from measure and calculated values as they apply to complex multiple path circuit. 2.5 Unexpected situations are dealt with safely and with the approval of an authorized person. 2.6 Problems are solved without 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. 3.2 Work site is cleaned and made safe in accordance with established procedures. 3.3 Justification for solutions used to solve circuit problems is documented. 3.4 Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

Variable	**Range**
This unit shall be demonstrated in relation to complex poly phase power circuits as they apply to problems related to electrical power engineering diagnosis and development work functions in any of the following types of circuit problems:	• Determining the operating parameters of an existing circuit • Alternating an existing circuit to comply with specified operating parameters • Developing circuits to comply with a specified function and operating parameters

Evidence Guide	

Critical aspects of Competence	Assessment requires evidence that the candidate:
	• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures
	• Apply sustainable energy principles and practices
	• Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
	• Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
	  • Solve problems in complex poly phase power circuits including:
	  • A Determining the operating parameters of existing circuit.
	  • Using established problem solving methods.

	• Taking relevant measurements accurately. • Interpreting measured values appropriately. • Providing effective solutions to circuit problems from measurements and calculations. • Giving written justification of solutions provided. • Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions
Underpinning Knowledge and Attitudes	Demonstrates knowledge to: • Poly phase power circuit analysis • Occupational Health and Safety principles
Underpinning Skills	Demonstrates skills to: • Poly phase power circuit analysis • Occupational Health and Safety practices • Electrical Safe working 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Solve Problems in D.C. Power Supplies with Single Phase Input**
Unit Code	**EIS TDM5 07 0612**
Unit Descriptor	This unit covers determining correct operation of independent power supplies and power supply sections of electronic apparatus. It encompasses working safely, problem solving procedures, including the use of voltage, current and resistance measuring devices, providing solutions derived from measurements and calculations to predictable problems in D.C. power supplies with single phases input.

Elements	Performance Criteria
1. Prepare to work on D.C. power supplies.	1.1 OHS procedures for a given work area are obtained and understood. 1.2 OHS risk control work preparation measures and procedures are followed. 1.3 The nature of the power supply problem is obtained from documentation or from work supervisor to establish the scope of work to be undertaken. 1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others. 1.5 Sources of materials that may be required for the work are established in accordance with established procedures. 1.6 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2. Solve d.c. power supply problems.	2.1 OHS risk control work measures and procedures 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 Circuits are checked as being isolated where necessary in strict accordance OHS requirements and procedures. 2.4 Established methods are used to solve problems from measure and calculated values as they apply to ***D.C. power supplies*** with single phase input. 2.5 Unexpected situations are dealt with safely and with the approval of an authorized person. 2.6 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. 3.2 Work site is cleaned and made safe in accordance with established procedures. 3.3 Justification for solutions used to solve circuit problems is documented. 3.4 Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

Variable	**Range**
This competence standard unit shall be demonstrated in relation to:	• solving problems in D.C. power supplies with single phase input on the rectification section and filtering section of a half wave bridge rectifier and a full wave bridge rectifier

Evidence Guide	

Critical Aspects of Competence	Assessment requires evidence that the candidate:
	• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures
	• Apply sustainable energy principles and practices
	• Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
	• Demonstrated performance across a representative range of contexts from the prescribed items below:
	  • Solve problems in D.C. power supplies with single phase input including:
	  • Using methodical problem solving methods.
	  • Taking measurements correctly and accurately.
	  • Calculating parameters correctly and accurately.
	  • Providing solution to power supply problems, and
	  • Providing written justification for the solutions to problems.
	  • Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions

Underpinning Knowledge and Attitudes	Demonstrates knowledge to: • Electronic fault finding • Direct current power supplies • Advanced electronic testing and measuring devices and techniques • Occupational Health and Safety principles

Underpinning Skills	Demonstrates skills to: • Electronic fault finding • Direct current power supplies • Advanced electronic testing and measuring devices and techniques • Occupational Health and Safety practices • Electronic Safe working 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Solve Problems in Digital Components of Electronic Apparatus**
Unit Code	**EIS TDM5 08 0612**
Unit Descriptor	This unit covers determining correct operation of digital components of electronic apparatus. It encompasses working safely, problem solving procedures, including the use of voltage, current and resistance measuring devices, providing solutions derived from measurements and calculations to predictable problems in digital components circuits.

Elements	Performance Criteria
1. Prepare to work on digital component.	1.1 OHS procedures for a given work area are obtained and understood. 1.2 OHS risk control work preparation measures and procedures are followed. 1.3 The nature of the ***digital component/circuit*** problems is obtained from documentation or from work supervisor to establish the scope of work to be undertaken. 1.4 Advice is sought from the work supervisor to ensure the work is coordinated effectively with others. 1.5 Sources of materials that may be required for the work are established in accordance with established procedures. 1.6 Tools, equipment and testing devices needed to carry out the work are obtained and checked for correct operation and safety.
2. Solve digital components problems.	2.1 OHS risk control work measures and procedures 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 Circuits are checked as being isolated where necessary in strict accordance OHS requirements and procedures. 2.4 Established methods are used to solve problems from measure and calculated values as they apply to digital components in an electronic apparatus. 2.5 Unexpected situations are dealt with safely and with the approval of an authorized person. 2.6 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. 3.2 Work site is cleaned and made safe in accordance with established procedures. 3.3 Justification for solutions used to solve circuit problems is documented. 3.4 Work completion is documented and an appropriate person or persons notified in accordance with established procedures.

Variable	**Range**
This competence standard unit shall be demonstrated in relation to solving at least two of the following types basic digital component/ circuit problems:	• Determining the operating parameters of a digital component of an existing circuit • Alternating an existing digital component to comply with specified operating parameters • Developing a basic digital component to comply with a specified function and operating parameters • Finding and repairing a fault in a digital component of an existing circuit

Evidence Guide	

Critical aspects of Competence	Assessment requires evidence that the candidate:
	• Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures
	• Apply sustainable energy principles and practices
	• Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
	• Demonstrated performance across a representative range of contexts from the prescribed items below:
	  • Solve problems in D.C. power supplies with single phase input including:
	  • Using methodical problem solving methods.
	  • Taking measurements correctly and accurately.
	  • Calculating parameters correctly and accurately.
	  • Providing solution to digital component/circuit problems.
	  • Providing written justification for the solutions to problems.
	  • Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions

Underpinning Knowledge and Attitudes	Demonstrates knowledge to: • Digital electronic fundamentals • Electronic fault finding • Electronic testing and measuring devices and techniques • Occupational Health and Safety principles
Underpinning Skills	Demonstrates skills to: • Electronic fault finding • Electronic testing and measuring devices and techniques • Occupational Health and Safety principles • Electronic Safe working 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Manage Electricity Supply Industry OHS Management System**
Unit Code	**EIS TDM5 09 0612**
Unit Descriptor	The competence standard is to be applied to establish, maintain and manage systematic approaches to managing OHS in the Electricity Supply Industry. It will be applied in a management context in terms of responsibility to ensure that the workplace is as far as practicable safe and without risk to employees, clients and other present visitors.

Elements	Performance Criteria
1. Plan to manage an ESI OHS management system	1.1 Purpose of the OHS management system is established after data is analyzed and expected outcomes of the work are confirmed with the appropriate personnel. 1.2 Legislative requirements and established procedures on policies and specifications for the OHS management system are obtained or established with the appropriate personnel. 1.3 Establish procedures and processes for identifying hazards, assessing and controlling risks as well as dealing with hazardous events. 1.4 Work roles and tasks are allocated according to requirements and individual's competencies. 1.5 Work is prioritized and sequenced for the most efficient outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures. 1.6 Establish and maintain appropriate participative processes with employees and their representatives in accordance with relevant industry standards consistent with enterprise procedures. 1.7 Deal with and resolve issues raised through participation and consultation promptly and effectively in accordance with procedures for issues resolution. 1.8 Provide information to employees about the outcome of participation and consultation in a manner accessible to employees.
2. Manage an ESI OHS management system	2.1 OHS management system(s) decisions are made on the basis of safety and effective outcomes according to requirements and established procedures. 2.2 Essential knowledge and associated skills are applied to

	analyze specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements. 2.3 Work teams are arranged to ensure planned goals are met according to established procedures. 2.4 Solutions to non-routine problems are identified and acted, using acquired essential knowledge and associated skills, according to requirements. 2.5 Quality of work is monitored against personal performance agreement and established organizational and professional standards. 2.6 Strategic plans are developed incorporating organization initiatives as per established procedures. 2.7 Develop workplace procedures for hazard identification, assessment and control of risks as well as dealing with hazardous events. 2.8 Manage and maintain OHS procedures and processes as well as dealing with hazardous events according to requirements and established procedures. 2.9 Address identification of all hazards at the planning, design and evaluation stages of any changes in the workplace to ensure that new hazards are not created by the proposed changes. 2.10 Develop and maintain procedures for selection and implementation of risk control measures in accordance with the hierarchy of control. 2.11 Identify inadequacies in existing control measures in accordance with the hierarchy of control and provide promptly resources enabling implementation of new measures.
3. Complete the management of an ESI OHS management system.	3.1 Final inspections of the OHS management systems are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project 3.2 Appropriate personnel are notified of completion and reports and completion documents are finalized. 3.3 Reports and completion documents are submitted to relevant personnel for approval and, where applicable, statutory or regulatory approval. 3.4 Approved copies of the OHS management systems documents are issued and records are updated in accordance with established procedures. 3.5 OHS Training needs are identified and an OHS induction

	and training program developed to fulfill employee's OHS training needs as a part of the enterprise general training program. 3.6 Training management system(s) are maintained so that individual employee's OHS training needs are easily identified, training attendance monitored and non attendance followed up. 3.7 Monitoring systems for keeping OHS records to meet regulatory requirements are maintained according to OHS legislative arrangements including identification of patterns of occupational injury and disease within area of managerial responsibility. 3.8 OHS system including policies, procedures and programs is assessed according to organizational aims with respect to OHS. 3.9 Recommendations and improvements to the OHS system are developed, documented and implemented to ensure effectiveness according to established procedures. 3.10 Compliance with OHS legislative requirements and established procedures is assessed to ensure that legal OHS standards are maintained as a minimum. 3.11 Appropriate personnel are notified on the outcomes of the evaluation(s) and recommendations and completion documents are finalized/ commissioned according to established procedures.

Variable	**Range**
The following constants and variables included this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform • Assessing risk • Assessment • Authorization • Confined space • Documenting detail work events, record keeping and or storage of information • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures • Fall prevention • Hazards • Identifying hazards • Inspect

	• Legislation • MSDS • Notification • OHS practices • OHS issues • Permits and/or permits to work • Personnel • Quality assurance systems • Requirements • Safe design principles • Testing procedures • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge to: • Power line installation safety • Power line safety - implementation and monitoring • Enterprise specific - policies and procedure instructions • Enterprise specific - OHS instructions
Underpinning Skills	Demonstrates skills to: • Power line installation safety • 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Coordinate and Direct Switching Schedules.**
Unit Code	**EIS TDM5 10 0612**
Unit Descriptor	This unit covers the co-ordination and direction of switching the HV and LV system. It includes coordinating switching between operating authorities and HV customers, etc. It also includes the direction of switching on the HV and LV electrical network.

Elements	Performance Criteria
1. Prepare/plan to coordinate and direct switching schedules	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are obtained, analyzed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination. 1.2 Work is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures. 1.3 Risk control measures are identified, prioritized and evaluated against the work schedule. 1.4 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites. 1.5 Hazards are identified, OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures. 1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures. 1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order. 1.8 Clients/customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements. 1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.

2. Carry out coordinate and direct switching schedules	2.1 OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and actioned in accordance with requirements and/or established procedures. 2.2 First aid, pole top rescue and other related work procedures are performed according to requirements and/or established procedures. 2.3 Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements. 2.4 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. 2.5 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures. 2.6 Coordination and direction of switching schedules is carried out, in accordance with the work schedule and requirements and/or established procedures. 2.7 Essential knowledge and associated skills in the safe the coordination and direction of switching schedules is applied to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. 2.8 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements. 2.9 Ongoing checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality like outcome is achieved for the client/customer and to a community/industry standard.
3. Complete coordinate and direct switching schedules	3.1 Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures. 3.2 Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures. 3.3 Relevant work permit(s) are signed off and electrical plant is returned to service and advice to client/customer in accordance with requirements. 3.4 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Variable	Range
The following constants and variables included this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform • Assessing risk • Assessment • Authorization • Confined space • Diagnostic, testing and restoration • Documenting detail work events, record keeping and or storage of information • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures • Fall prevention • Hazards • Identifying hazards • Inspect • Legislation • MSDS • Notification • OHS practices • OHS issues • Permits and/or permits to work • Personnel • Quality assurance systems • Requirements • Testing procedures • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge to: • Electrical Equipment - HV and LV Power line • Low voltage switching principles • High voltage switching principles

	• High voltage fault switching principles • High voltage distribution transformer principles • High voltage SWER system • Feeder automation system • System switching operations and authorization procedures - HV • System switching operations and authorization procedures – LV • Coordinating and directing switching schedules. • High voltage overhead and substation switching principles • Low voltage overhead and substation switching principles • High voltage switching instruction preparation • Low voltage switching instruction preparation • Enterprises specific - polices and procedure instructions • Enterprises specific - OHS instructions • Enterprises specific - technical drawing and documents • Enterprise specific - switching diagrams • Enterprise specific - specialized tools
Underpinning Skills	Demonstrates skills to: • Electrical Equipment - HV and LV Power line • Switchgear installation • Power line safety practices • High voltage switching practices • High voltage fault switching practices High voltage distribution transformer practices • High voltage SWER system • Feeder automation system • Coordinating and directing switching schedules. • Enterprise specific - switching diagrams • Enterprises specific - polices and procedure instructions • Enterprises 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Coordinate Vegetation Control Work**
Unit Code	**EIS TDM5 11 0612**
Unit Descriptor	This covers the coordination and implementation of continuous vegetation control and takes into account, arboreal regeneration, environmental issues and liaison and consultation procedures with, appropriate government agencies, property owners and environmental groups. It also encompasses conducting and/or contributing to public education processes and legislation issues.

Elements	Performance Criteria
1. Prepare/plan to coordinate vegetation control work	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are obtained, analyzed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination. 1.2 ***Work*** is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures. 1.3 Risk control measures are identified, prioritized and evaluated against the work schedule. 1.4 Relevant requirements and established procedures for the work are to all personnel and identified for all work sites. 1.5 Hazards are identified, OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures. 1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures. 1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order. 1.8 Clients/customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements. 1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are

	resolved and activities coordinated to carry out work. 1.10 Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorized where applicable in accordance with established procedures. 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 Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2. Carry out the coordination of vegetation control work	2.1 OHS and Sustainable Energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and actioned in accordance with requirements and/or established procedures. 2.2 First aid, pole top rescue and other related work procedures are performed according to requirements and/or established procedures. 2.3 Lifting, climbing, working in confined spaces and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements. 2.4 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. 2.5 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures. 2.6 Coordination of vegetation control work is carried out, in accordance with the work schedule and requirements and/or established procedures. 2.7 Essential knowledge and associated skills in the safe coordination of vegetation control work is applied to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. 2.8 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements. 2.9 Ongoing checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality like outcome is achieved for the client/customer and to a community/industry standard.
3. Complete the	3.1 Work undertaken is checked against works schedule for

coordination of vegetation control work	conformance with requirements, anomalies reported and solutions identified in accordance with established procedures. 3.2 Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures. 3.3 Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and are returned to service and advised to client/customer in accordance with requirements. 3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Variable	**Range**
Coordinating vegetation control measures which may include:	• hand clearing, • growth retardants, • machinery-assisted clearing and • herbicidal clearing
Coordinating work, which may be conducted from:	• a ladder, • an elevating work platform • a tree or • on the ground under minimal supervision
The following constants and variables included this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform • Assessing risk • Assessment • Authorization • Diagnostic, testing and restoration • Documenting detail work events, record keeping and or storage of information • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures • Fall prevention • Hazards • Identifying hazards

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

Evidence Guide	
Critical aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge to: • HV principles • Ecological principles for vegetation control • Fundamentals for working safely near live electrical apparatus
Underpinning Skills	Demonstrates skills to: • Vegetation control techniques • Coordinate vegetation control inspection programs
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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Develop Planned Outage Strategies**
Unit Code	**EIS TDM5 12 0612**
Unit Descriptor	This covers the competence required to assess, and manage the impact on the network and customers with regards to planned outages. This includes customer outage times, network and plant loading issues and regulatory requirements. A detailed knowledge of Network performance indicators is included.

Elements	Performance Criteria
1. Plan and coordinate for the development of outage strategies	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the outage strategies, are reviewed and determined. 1.2 Purpose of the strategies is established and expected outcomes of the work are confirmed with the appropriate personnel. 1.3 Organizational established procedures on policies and specifications for the strategies are obtained or established with the appropriate personnel. 1.4 Equipment/tools and personnel protective equipment are selected and coordinated based on specified requirements and established procedures 1.5 Work is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures 1.6 Risk control measures are identified, prioritized and evaluated against the work schedule relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures 1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures 1.8 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order 1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land-owners are resolved and activities coordinated to carry out work

	1.10 Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorized where applicable in accordance with established procedures
2. Carry out and coordinate outage strategies	2.1 Circuit/systems modeling is used to evaluate alternative proposals as per established procedures. 2.2 OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimize waste are incorporated into the strategy in accordance with requirements and/or established procedures 2.3 Strategy decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures 2.4 Mathematical models of the outage strategies are used to analyze the effectiveness of the finished project as per requirements and established procedures 2.5 Technical advice is given to potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures 2.6 Essential knowledge and associated skills are applied to analyze specific data and compare it with compliance specifications to ensure completion of the strategy within an agreed timeframe according to requirements. 2.7 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements 2.8 Quality of work is monitored against personal performance agreement and/or established organizational and professional standards.
3. Complete and coordinate outage strategies	3.1 Final review of the strategy is undertaken to ensure it complies with all requirements and include all specifications and documentations needed to complete the project. 3.2 Final review of the strategy is undertaken to ensure it complies with all requirements and include all specifications and documentations needed to complete the project. 3.3 Reports and/or completion documents are submitted to relevant personnel/organizations for approval and, where applicable, statutory or regulatory approval 3.4 Approved copies of ***outage strategy*** documents are issued and records are updated in accordance with established procedures.

Variable	Range
This shall/may be demonstrated in relation to the development of planned outage strategies and may include the following equipment:	• Distribution feeders/networks • zone substation networks • substations • transformers • HV switchgear • LV switchgear • relevant protection systems • (fuses and circuit breakers) • switching instructions (applicable to enterprise equipment) • computers (applicable to enterprise equipment) • network diagrams
The following constants and variables included in this unit:	• Appropriate and relevant persons • Appropriate authorities • Appropriate work platform • Assessing risk • Assessment • Authorization • Confined space • Diagnostic, testing and restoration • Documenting detail work events, record keeping and or storage of information • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures • Fall prevention • Hazards • Identifying hazards • Inspect • Legislation • MSDS • Notification. • OHS practices • OHS issues • Permits and / or permits to work • Personnel. • Quality assurance systems • Requirements. • Safe design principles • Testing procedure • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	.Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Occupational Health and Safety principles • Occupational health and safety , enterprise responsibilities • Coordinating permit access authority procedures. • Safe design principles • Low voltage switching principles • High voltage switching principles • High voltage overhead and substation switching principles
Underpinning Skills	Demonstrates skills to: • Occupational Health and Safety practices • Electrical safe working practice • Safe design practices • Switchgear installation • Low voltage switching practices • High voltage switching practices • High voltage overhead and substation switching 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Establish and Manage Geographical Information Systems Data**
Unit Code	**EIS TDM5 13 0612**
Unit Descriptor	This competence standard unit covers the preparation and updating of detailed plans to be used during the construction phase of all design activities, and utilized by network owners as technical reference materials, to detail system infrastructure. It includes the use of GIS.

Elements	Performance Criteria
1. Plan and coordinate for the establishment and management of geographical information system data	1.1 OHS practices/procedures and Environmental and Sustainable Energy procedures, which may influence the ***establishment and management of graphical information systems***, are reviewed and determined. 1.2 Purpose of the geographical information systems is established and expected outcomes of the work are confirmed with the appropriate personnel. 1.3 Organizational established procedures on policies and specifications for the geographical information systems are obtained or established with the appropriate personnel. 1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures 1.5 Work is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures 1.6 Risk control measures are identified, prioritized and evaluated against the work schedule Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures 1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order 1.8 Liaison and communication issues with other/authorized personnel, authorities, clients and land-owners are resolved and activities coordinated to carry out work 1.9 Personnel participating in the work, including plant operators and contractors, are fully briefed and respective

	responsibilities coordinated and authorized where applicable in accordance with established procedures
2. Carry out and coordinate the establishment and management of geographical information system data	2.1 Circuit/systems modeling is used to evaluate alternative proposals as per established procedures. 2.2 OHS and Sustainable Energy principles, functionality and practices to reduce the incidents of accidents and minimize waste are incorporated into the project in accordance with requirements and/or established procedures 2.3 Decisions concerning the establishment and management of graphical information systems are made on the basis of safety and effective outcomes according to requirements and/or established procedures 2.4 Mathematical/engineering models of the establishment and management of geographical information systems are used to analyze the effectiveness of the finished project as per requirements and established procedures 2.5 Technical advice is given to potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures 2.6 Essential knowledge and associated skills are applied to analyze specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements. 2.7 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements 2.8 Quality of work is monitored against personal performance agreement and/or established organizational and professional standards.
3. Complete and coordinate the establishment and management of geographical information and management process	3.1 Final review of the establishment and management process are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief. 3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalized. 3.3 Reports and/or completion documents are submitted to relevant personnel/organizations for approval and, where applicable, statutory or regulatory approval 3.4 Approved copies of documents regarding the establishment with established procedures are issued and records are updated in accordance with system data.

Variable	Range
This Competence Standard Unit shall/may be demonstrated in relation to the establishment and management of geographical information systems and may include the following equipment:	• Geographical information system, computer aided drafting software, construction drawings, design sketches and as built drawings.
The following constants and variables included in this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform. • Assessing risk • Assessment • Authorization • Confined space • Diagnostic, testing and restoration. • Documenting detail work events, record keeping and or storage of information. • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation. • Environmental management documentation. • Established procedures. • Fall prevention • Hazards • Identifying hazards • Inspect • Legislation • MSDS • Notification. • OHS practices • OHS issues • Permits and / or permits to work • Personnel. • Quality assurance systems. • Requirements. • Safe design principles • Testing procedures • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Drawings and diagrams • Occupational health and safety principles • Occupational health and safety principles - enterprise responsibilities • Power line distribution installation. • Electrical equipment - HV and LV Power line • Safe design principles • Enterprises specific - Technical drawing and documents • Enterprise specific – switching diagrams • Enterprise specific - data management processes • Locate and rectify faults in electrical equipment • Geographic information systems principles
Underpinning Skills	Demonstrates skills to: • Drawings and diagrams • Occupational health and safety practice • Electrical safe working practices • Power line distribution installation. • Electrical equipment - HV and LV Power line • Safe design practices • Enterprise specific – switching diagrams • Locate and rectify faults in electrical 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Coordinate LV Distribution Network Demand**
Unit Code	**EIS TDM5 14 0612**
Unit Descriptor	This covers the coordination of the switching of LV distribution network components with due regard to the loadings and prevailing network constraints and may include scheduling of generators, VAR compensators, load shedding and non-essential loads in response to NEMMCO or network requirements. It also includes voltage control equipment.

Elements	Performance Criteria
1. Plan for the coordination of LV distribution network demand	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the ***coordination of LV Distribution network demand systems***, are reviewed and determined. 1.2 Purpose of the coordination of the network demand is established after data is analyzed and expected outcomes of the work are confirmed with the appropriate personnel. 1.3 Organizational established procedures on policies and specifications for the coordination of the network demand are obtained or established with the appropriate personnel. 1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief. 1.5 Testing parameters are established from organizational established procedures on polices and specifications. 1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures. 1.7 Work roles and tasks are allocated according to requirements and individuals' competencies. 1.8 Work is prioritized and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures. 1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work. 1.10 Risk control measures are identified, prioritized and

	evaluated against the work schedule. 1.11 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2. Carry out the coordination of LV distribution network demand	2.1 Circuit/systems modeling are used to evaluate alternative proposals as per established procedures. 2.2 OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimize waste are incorporated into 2.3 the project in accordance with requirements and/or established procedures. 2.4 Coordination decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures. 2.5 Mathematical and/or engineering models of the coordination process are used to analyze the effectiveness of the finished project as per requirements and established procedures. 2.6 Technical advice is given to potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures. 2.7 Essential knowledge and associated skills is applied to analyze specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements. 2.8 Testing of the coordination process is undertaken according to requirements and established procedures. 2.9 Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures. 2.10 Solutions to non-routine problems are identified and actioned, using acquired Essential knowledge and associated skills, according to requirements. 2.11 Quality of work is monitored against personal performance agreement and/or established organizational and professional standards. 2.12 Strategic plans are developed incorporating organization initiatives as per established procedures.

3. Complete the coordination of LV distribution network demand	3.1 Final review of the coordination process is undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the project. 3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalized/ commissioned. 3.3 Reports and/or completion documents are submitted to relevant personnel/organizations for approval and, where applicable, statutory or regulatory approval. 3.4 Approved copies of managed LV Distribution network demand documents are issues and records are updated in accordance with established procedures.

Variable	**Range**
This shall/may be demonstrated in relation to the coordination of a switching of LV distribution network components with due regard to the loadings and prevailing network constraints and shall/may be demonstrated using the following:	• LV distribution feeders/distribution network; • transformers or regulators with LV windings; • LV bus bars; • LV isolators ; • LV switchgear (applicable to enterprise equipment); • generation that interconnects with the LV network; • VAR compensation devices that interconnect with the LV network; • switching instructions (applicable to enterprise equipment); • computers (applicable to enterprise equipment); • network diagrams (applicable to enterprise equipment)
The following constants and variables included in this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform • Assessing risk • Assessment, Diagnostic, testing and restoration • Authorization • Confined space • Documenting detail work events, record keeping and or storage of information • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures

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

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Occupational Health and Safety principles • Enterprise specific — procedures and work practices relating to managing network demand • Enterprise specific — effective management and communication of people • Enterprise specific — writing management reports
Underpinning Skills	Demonstrates skills to: • Occupational Health and Safety practices • Electrical safe working practice • Enterprise specific — procedures and work practices relating to managing network demand • Enterprise specific — effective management and communication of people • Enterprise specific — writing management reports
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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Coordinate HV Transmission and Sub-Transmission Networks**
Unit Code	**EIS TDM5 15 0612**
Unit Descriptor	This covers the monitoring of HV transmission and sub transmission networks in real time. This includes voltage control and monitoring the status of access authorities and ensuring that the network is operated within design parameters at all times. It also includes dispatching and coordination of field repair crews to respond to and rectify abnormalities and liaison with other electrical authorities.

Elements	Performance Criteria
1. Plan for the coordination of HV transmission and sub Transmission network	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the coordination of HV transmission and sub transmission Network, are reviewed and determined. 1.2 Purpose of the coordination of the network is established after data is analyzed and expected outcomes of the work are confirmed with the appropriate personnel. 1.3 Organizational established procedures on policies and specifications for the coordination of the network are obtained or established with the appropriate personnel. 1.4 Testing procedures are discussed with/directed to the appropriate personnel in order to ascertain the project brief. 1.5 Testing parameters are established from organizational established procedures on policies and specifications. 1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures. 1.7 Work roles and tasks are allocated according to requirements and individuals' competencies. 1.8 Work is prioritized and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures. 1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work. 1.10 Risk control measures are identified, prioritized and

	evaluated against the work schedule. 1.11 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2. Carry out the coordination of HV transmission and sub Transmission network	2.1 Circuit/systems modeling are used to evaluate alternative proposals as per established procedures. 2.2 OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimize waste are incorporated into the project in accordance with requirements and/or established procedures. 2.3 Coordination decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures. 2.4 Mathematical and/or engineering models of the coordination process are used to analyze the effectiveness of the finished project as per requirements and established procedures. 2.5 Technical advice is given regarding potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures. 2.6 Essential knowledge and associated skills are applied to analyze specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements. 2.7 Testing of coordination process is undertaken according to requirements and established procedures. 2.8 Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures. 2.9 Solutions to non-routine problems are identified and actioned, using acquired essential knowledge and associated skills, according to requirements. 2.10 Quality of work is monitored against personal performance agreement and/or established organizational and professional standards. 2.11 Strategic plans are developed incorporating organization initiatives as per established procedures.
3. Complete the coordination of HV	3.1 Final review of the coordination processes is undertaken to ensure they comply with all requirements and include all specifications and documentations needed to

transmission and sub Transmission network	complete the project. 3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalized/ commissioned. 3.3 Reports and/or completion documents are submitted to relevant personnel/organizations for approval and, where applicable, statutory or regulatory approval. 3.4 Approved copies of coordination documents are issued and records are updated in accordance with established procedures.

Variable	**Range**
This shall/may be demonstrated in relation to the monitoring of HV transmission and sub transmission networks (may also be applied to include rail/tram networks), ensuring that the network is operated within design parameters at all times and shall/may be demonstrated using the following:	• HV Sub transmission feeders/sub transmission network; • HV Transmission feeders/transmission network; • transformers with HV windings; • HV bus bars; • HV isolators; • HV switchgear (applicable to enterprise equipment); • Switching instructions (applicable to enterprise equipment); • computers (applicable to enterprise equipment); • network diagrams (applicable to enterprise equipment); • access authorities; • regulatory requirements
The following constants and variables included in this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform • Assessing risk • Assessment, Diagnostic, testing and restoration • Authorization • Confined space • Documenting detail work events, record keeping and or storage of information • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation

	• Environmental management documentation • Established procedures • Fall prevention • Hazards and Identifying hazards • Inspect • Legislation • MSDS • Notification • OHS practices • OHS issues • Permits and/or permits to work • Personnel • Quality assurance systems • Requirements • Testing procedures • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Occupational Health and Safety principles • Coordinating permit access authority procedures • Coordinating and directing switching instructions • High voltage overhead and substation switching principles • High voltage switching instruction preparation
Underpinning Skills	Demonstrates skills to: • Occupational Health and Safety practices • Electrical safe working practice • Systems switching operations and authorization procedures — HV • High voltage overhead and substation switching practices • High voltage switching instruction preparation
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Maintain Network Protection and Control System (Interdependent)**
Unit Code	**EIS TDM5 16 0612**
Unit Descriptor	This covers the maintenance of network protection and control systems in complex situations and includes isolation, inspection, monitoring, testing, adjustment, and repair, refurbishment and or overhaul and functional checks. It includes schemes from discrete and interdependent and also schemes such as, distance, differential, transformer differential, bus zone, bus over current, revenue metering, SCADA, communications, harmonic control, point on wave.

Elements	Performance Criteria
1. Plan for the maintenance of network protection and control systems (complex)	1.1 OHS practices/procedures and Environmental and sustainable energy procedures, which may influence the ***maintenance of network protection and control systems (complex)*** are reviewed and determined. 1.2 Purpose of the maintenance of network protection and control systems (complex) is established after data is analyzed and expected outcomes of the work are confirmed with the appropriate personnel. 1.3 Organizational established procedures on policies and specifications for the maintenance of network protection and control systems (complex) are obtained or established with the appropriate personnel. 1.4 Testing procedures are discussed with and/or directed to the appropriate personnel in order to ascertain the project brief. 1.5 Testing parameters are ascertained from organizational established procedures, policies and specifications 1.6 Equipment/tools and personal protective equipment are selected based on specified Performance Criteria and established procedures. 1.7 Work roles and tasks are allocated according to requirements and individuals' competencies. 1.8 Work is prioritized and sequenced for the most efficient/effective outcome, completed within an acceptable timeframe to a quality standard and in accordance with established procedures. 1.9 Liaison and communication issues with other/authorized

	personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work. 1.10 Risk control measures are identified, prioritized and evaluated against the work schedule. 1.11 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
2. Carry out the maintenance of network protection and control systems (complex)	2.1 Circuit/systems modeling is used to evaluate alternative proposals as per established procedures. 2.2 OHS and Sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimize waste are incorporated into 2.3 the project in accordance with requirements and/or established procedures. 2.4 Maintenance of network protection and control systems (complex) decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures. 2.5 Mathematical and/or engineering models of the scheme are used to analyze the effectiveness of the finished project as per requirements and established procedures. 2.6 Technical advice is given to potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures. 2.7 Essential knowledge and associated skills is applied to analyze specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements. 2.8 Testing of network protection and control systems (complex) is undertaken according to requirements and established procedures. 2.9 Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures. 2.10 Solutions to non-routine problems are identified and actioned, using acquired Essential Knowledge and Associated Skills, according to requirements. 2.11 Quality of work is monitored against personal performance agreement and/or established organizational and professional standards.

	2.12 Strategic plans are developed incorporating organization initiatives as per established procedures.
3. Complete the maintenance of network protection and control systems (complex)	3.1 Final inspections of the network protection and control systems (complex) are undertaken to ensure they comply with all requirements and include all specifications and documentation needed to complete the project. 3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalized/ commissioned. 3.3 Reports and/or completion documents are submitted to relevant personnel/organizations for approval and, where applicable, statutory or regulatory approval. 3.4 Approved copies of the maintenance of network protection and control systems (complex) documents are issued and records are updated in accordance with established procedures.

Variable	**Range**
This shall/may be demonstrated in relation to the maintenance of network protection and control systems (interdependent) and may include the following:	• Over current • Frame leakage • Cooling, Bucholz • DC Supplies • Restricted Earth • Sensitive Earth Fault • CB Fail • Reclose • DC Frame leakage • CEL Fail • Under Frequency load shed • Instrument Transformers • Trip/Control circuits • Alarms • DC Supplies • CB Fail protection • Master controlled Earth Fault • Inter tripping • Blocking • Synchronizing • Pilot Wire • Phase Comparison • Load Shedding • Voltage control • parallel operation

	• load rejection • circuit isolations and restorations • mechanical adjustments • calibration • function tests • reporting • signals • thermals • contra phase • backup • reverse current
The following constants and variables included in this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform • Assessing risk • Assessment • Authorization • Confined space • Diagnostic, testing and restoration • Documenting detail work events, record keeping and or storage of information • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures • Fall prevention • Hazards • Identifying hazards • Inspect • Legislation • MSDS • Notification • OHS practices • OHS issues • Permits and/or permits to work • Personnel • Quality assurance systems. • Requirements • Testing procedures • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning	Demonstrates knowledge of:

Knowledge and Attitudes	• Occupational Health and Safety principles • Statutory and safety considerations • Occupational Health and Safety , - enterprise responsibilities • Discrete protection devices - isolation and tagging procedures • Protection devices - maintenance and commissioning principles • Protection devices - manufacturers requirements • Disconnect and reconnect fixed wiring electrical equipment fundaments • Disconnect and reconnect fixed wiring electrical equipment procedures • Harmonics
Underpinning Skills	Demonstrates skills to: • Occupational Health and Safety practices • Electrical safe working practices • Electrical equipment - protection and control schemes • Disposal procedures for insulating materials • Visual inspection procedures - substations • Surge relay operation and maintenance - substations • Analyze and interpret results and measurements - substations • Infrared imaging principles - substations • Commissioning of distribution protection and control systems - substations • Voltage regulation scheme principles - substations • Use of test equipment on discrete protection scheme - substations • Electrical equipment - distribution field device protection and control schemes - substations • Circuit breaker auxiliary systems • Discrete protection systems • Interdependent protection systems • Locate and rectify faults in electrical 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Manage Electrical Infrastructure Projects**
Unit Code	**EIS TDM5 17 0612**
Unit Descriptor	This covers the work planning and resource requirements, and financial control of infrastructure projects being undertaken within the distribution, sub transmission and transmission, overhead and underground networks. It includes project management activities, which may involve the simultaneous management of many projects, and must encompass at least 20 identifiable tasks.

Elements	Performance Criteria
1. Plan for and coordinate the management of electrical infrastructure projects	1.1 OHS practices/procedures and Environmental and Sustainable Energy procedures, which may influence the ***management of electrical infrastructure projects***, are reviewed and determined. 1.2 Purpose of the electrical infrastructure project is established and expected outcomes of the work are confirmed with the appropriate personnel. 1.3 Organizational established procedures on policies and specifications for the electrical infrastructure project are obtained or established with the appropriate personnel. 1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures. 1.5 Work is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures. 1.6 Risk control measures are identified, prioritized and evaluated against the work schedule. 1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures. 1.8 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order. 1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved and activities coordinated 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 coordinated and authorized where applicable in accordance with established procedures. 1.12 Positioning of road signs, barriers and warning devices is planned in accordance with requirements.
2. Carry out and coordinate the management of electrical infrastructure projects	2.1 OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimize waste are incorporated into the project in accordance with requirements and/or established procedures. 2.2 System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures. 2.3 Mathematical models of relevant networks are used to analyze the effectiveness of the finish project as per requirements and established procedures. 2.4 Technical advice is given to potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures. 2.5 Essential knowledge and associated skills is applied to analyze specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements. 2.6 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements. 2.7 Quality of work is monitored against personal performance agreement and/or established organizational and professional standards. 2.8 Testing of electrical infrastructure is undertaken according to requirements and established procedures. 2.9 Electrical infrastructure decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures 2.10 Work teams/groups are arranged/coordinated/evaluated to ensure planned goals are met according to established procedures.

3. Complete and coordinate the management of electrical infrastructure projects	3.1 Final inspections of the infrastructure are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief. 3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalized. 3.3 Reports and/or completion documents are submitted to relevant personnel/organizations for approval and, where applicable, statutory or regulatory approval. 3.4 Approved copies of project documents are issued and records are updated in accordance with established procedures.

Variable	**Range**
This shall/may be demonstrated in relation to the management of electrical infrastructure projects and may include the following:	• contract and in-house workforces, • project management software
The following constants and variables included in this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform • Assessing risk • Assessment • Authorization • Confined space • Diagnostic, testing and restoration • Documenting detail work events, record keeping and or storage of information • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures • Fall prevention • Hazards • Identifying hazards • Inspect • Legislation • MSDS • Notification

	• OHS practices • OHS issues • Permits and/or permits to work • Personnel • Quality assurance systems • Requirements • Safe design principles • Testing procedures • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	• Demonstrates knowledge of: • Occupational Health and Safety principles • Occupational Health and Safety , enterprise responsibilities • Power line distribution installation • Power line installation safety • Pole and hardware installation • Low voltage electrical service installation • Installation and maintenance on transmission lines and associated equipment • Installation and maintenance of public lighting and associated equipment • Distribution overhead line component fundamentals • Working on live lines up to 33kV with glove and barrier/Hot stick combined • Safe design principles • Low voltage switching principles • High voltage switching principles • High voltage fault switching principles • Power line environmental impact – implementation and monitoring • Interpretation of power distribution network drawings and documentation • Overhead distribution extension layout principles • Surveying techniques • Project management

Underpinning Skills	• Demonstrates skills to: • Occupational Health and Safety practices • Electrical safe working practice • Power line distribution installation • Power line installation safety • Pole and hardware installation • Low voltage electrical service installation • Installation and maintenance on transmission lines and associated equipment • Installation and maintenance of public lighting and associated equipment • Working on live lines up to 33kV with glove and barrier/Hot stick combined • Safe design practices • Low voltage switching practices • High voltage switching practices • High voltage fault switching practices • Overhead distribution extension layout practices • Surveying techniques
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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Review Asset Management Strategies**
Unit Code	**EIS TDM5 18 0612**
Unit Descriptor	This covers the management of assets within the distribution and sub transmission networks. This includes plant optimization, condition monitoring, maintenance strategies and policies and capital works planning, including recommendations for continual improvement. Cost benefit analysis is fundamental for successful implementation of the a fore mentioned asset management functions.

Elements	Performance Criteria
1. Plan and coordinate for the establishment and implementation of asset management systems	1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the ***design of asset management systems***, are reviewed and determined. 1.2 Purpose of the design is established and expected outcomes of the work are confirmed with the appropriate personnel. 1.3 Organizational established procedures on policies and specifications for the design are obtained or established with the appropriate personnel. 1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures 1.5 Work is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures 1.6 Risk control measures are identified, prioritized and evaluated against the work schedule 1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures 1.8 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order 1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land-owners are resolved and activities coordinated 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
2. Carry out and coordinate the establishment and implementation of asset management systems	3.1 Circuit/systems modeling is used to evaluate alternative proposals as per established procedures. 3.2 OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimize waste are incorporated into the project in accordance with requirements and/or established procedures 3.3 System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures 3.4 Mathematical models of the distribution system are used to analyze the effectiveness of the finished project as per requirements and established procedures 3.5 Technical advice is given to potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures 3.6 Essential knowledge and associated skills are applied to analyze specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements. 3.7 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements 2.2 Quality of work is monitored against personal performance agreement and/or established organizational and professional standards.
3. Complete and coordinate the establishment and implementation of asset management systems	3.1 Final inspections of the design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief. 3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalized. 3.3 Reports and/or completion documents are submitted to relevant personnel/organizations for approval and, where applicable, statutory or regulatory approval 3.4 Approved copies of design documents are issued and records are updated in accordance with established procedures.

Variable	Range
This shall/may be demonstrated in relation to the review of asset management strategies and include:	• specific enterprise tools, • equipment, information data systems and • other resources typical of a workplace
The following constants and variables included in this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform. • Assessing risk • Assessment • Authorization • Confined space • Diagnostic, testing and restoration. • Documenting detail work events, record keeping and or storage of information. • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation. • Environmental management documentation. • Established procedures. • Fall prevention • Hazards • Identifying hazards • Inspect • Legislation • MSDS • Notification. • OHS practices • OHS issues • Permits and / or permits to work • Personnel. • Quality assurance systems. • Requirements. • Safe design principles • Testing procedures • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Occupational health and safety principles • Occupational health and safety , enterprise responsibilities • Safe design principles • Enterprise specific - data management processes • Enterprise specific - effective management and communication. • Enterprise specific - write management reports. • Interpretation of power distribution network drawings and documentation • Overhead distribution extension layout principles
Underpinning Skills	Demonstrates skills to: • Occupational health and safety practices • Electrical safe working practice • Safe design practices • Enterprise specific - data management processes skill • Enterprise specific - effective management and communication • Enterprise specific - write management reports • Overhead distribution extension layout 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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Develop HV And LV Distribution Protection Systems**
Unit Code	**EIS TDM5 19 0612**
Unit Descriptor	This covers the development of appropriate protection systems for HV and LV distribution networks, including calculations of fault levels, selection of appropriate protection devices and automation requirements and protection coordination schemes. This also includes recommendations to support the calculations and must ensure conformance to specific organizational operational and system planning requirements, and compliance with national or supply authority codes.

Elements	Performance Criteria
1. Plan and coordinate for the development of HV and LV protection systems	1.1 OHS practices/procedures and Environmental and Sustainable Energy procedures, which may influence the ***development of HV and LV protection systems***, are reviewed and determined. 1.2 Purpose of the development is established and expected outcomes of the work are confirmed with the appropriate personnel. 1.3 Organizational established procedures on policies and specifications for the development are obtained or established with the appropriate personnel. 1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures. 1.5 Work is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures. 1.6 Risk control measures are identified, prioritized and evaluated against the work schedule. 1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures. 1.8 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order. 1.9 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved and activities coordinated 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 coordinated and authorized where applicable in accordance with established procedures.
2. Carry out and coordinate the development of HV and LV protection systems	2.1 Circuit/systems modeling are used to evaluate alternative proposals as per established procedures. 2.2 OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimize waste are incorporated into the project in accordance with requirements and/or established procedures. 2.3 System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures. 2.4 Mathematical models of the HV/LV protection system are used to analyze the effectiveness of the finished project as per requirements and established procedures. 2.5 Technical advice is given to potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures. 2.6 Essential knowledge and associated skills are applied to analyze specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements. 2.7 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements. 2.8 Quality of work is monitored against personal performance agreement and/or established organizational and professional standards.
3. Complete and coordinate the development of HV and LV protection systems	3.1 Final inspections of the development's design are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief. 3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalized. 3.3 Reports and/or completion documents are submitted to relevant personnel/organizations for approval and, where applicable, statutory or regulatory approval.

	3.4 Approved copies of design documents are issued and records are updated in accordance with established procedures.

Variable	Range
This shall/may be demonstrated in relation to the development of high voltage and low voltage distribution protection systems and may include the following equipment:	• ACR • regulator • earthen • air break switches • gas switches • capacitor units • transformers • links • fuses • sectionalizes • lead Arrestors • HV Switchgear • LV Switchgear • control boxes • communications equipment • supervisory cable • cable TV • Substations • relevant protection • systems and • associated civil works
The following constants and variables included in this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform • Assessing risk • Assessment • Authorization • Confined space • Diagnostic, testing and restoration • Documenting detail work events, record keeping and or storage of information. • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures • Fall prevention • Hazards • Identifying hazards • Inspect • Legislation • MSDS • Notification • OHS practices • OHS issues • Permits and/or permits to work • Personnel • Quality assurance systems • Requirements

	• Safe design principles • Testing procedures • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Occupational Health and Safety principles • Occupational Health and Safety , enterprise responsibilities • Safe design principles • Switchgear installation • Electrical equipment - distribution field device protection and control schemes - substations • Fault calculation techniques • Discrete protection systems • Poly phase circuit analysis • Protection schemes
Underpinning Skills	Demonstrates skills to: • Occupational Health and Safety practices • Electrical safe working practice • Safe design practices • Switchgear installation • Electrical equipment - distribution field device protection and control schemes - substations • Fault calculation techniques • Discrete protection systems • Poly phase circuit analysis • Protection schemes
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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Prepare and Manage Detailed Construction Plans for Electrical System Infrastructure**
Unit Code	**EIS TDM5 20 0612**
Unit Descriptor	This covers the preparation of detailed plans to be used during the design phase and preparation of as-built drawings during the construction phase, and utilized by network owners as technical reference materials, to detail system infrastructure. It includes the use of CAD or other relevant drafting methods.

Elements	Performance Criteria
1. Plan and coordinate the preparation and management of detailed construction plans for electrical system infrastructure	1.1 OHS practices/procedures, which may influence the ***preparation and management of detailed construction, plans for electrical system infrastructure*** are reviewed and determined. 1.2 Purpose of the construction plans is established and expected outcomes of the work are confirmed with the appropriate personnel. 1.3 Established organizational procedures, policies and specifications for the construction plans are obtained or established with the appropriate personnel. 1.4 Work is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures. 1.5 Risk control measures are identified, prioritized and evaluated against the work schedule. 1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures. 1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order. 1.8 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work. 1.9 Site is prepared according to the work schedule and to minimize risk and damage to property, commerce, and individuals in accordance with established procedures.

2. Carry out and coordinate the preparation and management of detailed construction plans for electrical system infrastructure	2.1 OHS and sustainable energy principles, functionality and practices to reduce the incidents of accidents and minimize waste are incorporated into the project in accordance with requirements and/or established procedures 2.2 System design decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures. 2.3 Mathematical models of the distribution system are used to analyze the effectiveness of the finished project as per requirements and established procedures 2.4 Technical advice is given to potential hazards, safety risks and control measures so that monitoring and preventative action can be undertaken and/or appropriate authorities consulted, here necessary, in accordance with requirements and established procedures. 2.5 Essential knowledge and associated skills is applied to analyze specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements. 2.6 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements. 2.7 Quality of work is monitored against personal performance agreement and/or established organizational and professional standards.
3. Complete and coordinate the preparation and management of detailed construction plans for electrical system infrastructure	1.10 Final inspections of the construction plans are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the design brief. 1.11 Appropriate personnel are notified of completion and reports and/or completion documents are finalized. 1.12 Reports and/or completion documents are submitted to relevant personnel/organizations for approval and, where applicable, statutory or regulatory approval. 1.13 Approved copies of construction plan documents are issued and records are updated in accordance with established procedures.

Variable	**Range**
This shall/may be demonstrated in relation to the preparation and	• Drafting software • Computer hardware • Reference manuals

management of detailed construction plans for electrical infrastructure and may include the following equipment:	• Design sketches
The following constants and variables included in this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Appropriate work platform • Assessing risk • Assessment • Authorization • Confined space • Diagnostic, testing and restoration • Documenting detail work events, record keeping and or storage of information • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures • Fall prevention • Hazards • Identifying hazards • Inspect • Legislation • MSDS • Notification • OHS practices • OHS issues • Permits and/or permits to work • Personnel • Quality assurance systems • Requirements • Safe design principles • Testing procedures • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Occupational Health and Safety principles • Occupational Health and Safety principles - enterprise responsibilities

	• Power line safety - implementation and monitoring • Safe design principles • High voltage SWER system • Environmental fundamentals • Enterprises specific - policy and procedure instructions • Enterprises specific - OHS instructions • Enterprises specific - technical drawing and documents • Interpretation of power distribution network drawings and documentation • DC transmission system principles • AC transmission system components • AC transmission line electrical parameters • AC transmission line equivalent circuit calculations • Voltage control devices on interconnected transmission systems • Calculation of rating of voltage control devices • Control of transient over voltages • Corona and discharge losses • Protection scheme requirements
Underpinning Skills	Demonstrates skills to: • Occupational Health and Safety practices • Electrical safe working practice • Transmission, distribution and rail power systems • Power line distribution installation • Pole and hardware installation • Underground cable construction • Power line safety practices • Safe design practices • High voltage SWER system • Enterprise specific - switching diagrams • Power system layouts • Circuit breaker auxiliary systems • DC transmission system practices • Voltage control devices on interconnected transmission systems • Calculation of rating of voltage control devices • Control of transient over voltages • Corona and discharge losses
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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Develop HV Switching Schedule and Program**
Unit Code	**EIS TDM5 21 0612**
Unit Descriptor	This covers the preparation of a basic switching schedule for interconnected HV network plant. It includes planning basic outages and taking into account loading of network components. It also includes the calculation of network loading conditions to ensure the network is operating within designed parameters.

Elements	Performance Criteria
1. Prepare/plan to develop HV switching schedules	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are obtained, analyzed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination. 1.2 Work is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures. 1.3 Risk control measures are identified, prioritized and evaluated against the work schedule. 1.4 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites. 1.5 Hazards are identified, OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures. 1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures. 1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order. 1.8 Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements. 1.9 Personnel participating in the work, including plant operators and contractors, are fully briefed and respective

	responsibilities coordinated and authorized where applicable in accordance with established procedures. 1.10 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
2. Carry out the development of HV switching schedules	2.1 OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and actioned 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 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures. 2.4 ***Development of HV switching schedules*** is carried out, in accordance with the work schedule and requirements and/or established procedures. 2.5 Essential knowledge and associated skills are applied in the safe development of HV switching schedules to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. 2.6 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements. 2.7 Ongoing checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality like outcome is achieved for the client/customer and to a community/industry standard.
3. Complete development of HV switching schedules	3.1 Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures. 3.2 Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures. 3.3 Ensure relevant work permit(s) are signed off and plant is returned to service and advised to client/customer in accordance with requirements. 3.4 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Variable	Range
This shall/may be demonstrated in relation to the development of HV switching schedules and include:	• the use of system diagrams • data schedules • system loading data and • use of computer based systems
The following constants and variables included in this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Assessing risk • Assessment • Authorization • Confined space • Documenting detail work events, record keeping and or storage of information • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures • Hazards • Identifying hazards • Inspect • Legislation • Notification • OHS practices • OHS issues • Permits and/or permits to work • Personnel • Quality assurance systems • Requirements • Testing procedures • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and	Demonstrates knowledge of: • High voltage switching principles

Attitudes	• High voltage fault switching principles • High voltage distribution transformer principles • High voltage SWER system • Feeder automation system • System switching operations and authorization procedures - HV • High voltage overhead and substation switching principles • High voltage switching instruction preparation • Enterprises specific - policies and procedure instructions • Enterprises specific - OHS instructions • Enterprises specific - technical drawing and documents • Enterprise specific – switching diagrams
Underpinning Skills	Demonstrates skills to: • Electrical equipment - HV and LV Power line • High voltage switching practices • High voltage fault switching practices • High voltage distribution transformer practices • High voltage SWER system • Feeder automation system • System switching operations and authorization procedures - HV • High voltage overhead and substation switching pactices • High voltage switching instruction preparation • Enterprises specific - policies and procedure instructions • Enterprises specific - OHS instructions • Enterprise specific – switching diagrams
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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Coordinate Permit Procedures**
Unit Code	**EIS TDM5 22 0612**
Unit Descriptor	This covers the coordination of work procedures that require the issue of electrical permits to work and other permits for working on major parts of the electrical network. It encompasses the analysis and coordination of all work activities planned to be undertaken within more or less the same time timeframe to ensure that: the organization's work safety and statutory requirements are complied with; the extent of power interruption, and hence inconvenience to customers, is minimized; and the effective utilization of available resources, both from the organization and from its contractors to ensure all planned activities are timely completed to specified standards and requirements.

Elements	Performance Criteria
1. Prepare/plan to coordinate permit procedures	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are obtained, analyzed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination. 1.2 Work is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures. 1.3 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites. 1.4 Hazards are identified, OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures. 1.5 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures. 1.6 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and applied in the coordination of permit procedures according to established procedures. 1.7 Clients/customers are provided with possible solutions and/or options within the scope, acceptable cost and

	requirements. 1.8 Liaison and communication issues with other/authorized personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work.
2. Carry out the coordination of permit procedures	2.1 OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimize waste are monitored and actioned 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 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures. 2.4 ***Coordination of permit procedures*** is carried out, in accordance with the work schedule and requirements and/or established procedures. 2.5 Essential Knowledge and Associated Skills in the safe co-ordination of permit procedures is applied to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. 2.6 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements. 2.7 Ongoing checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality like outcome is achieved for the client/customer and to a community/industry standard.
3. Complete the coordination of permit procedures	3.1 Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures. 3.2 Relevant work permit(s) are signed off and, plant is returned to service and advised to client/customer in accordance with requirements. 3.3 Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures. 3.4 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Variable	Range

This shall/may be demonstrated in relation to the coordination of permit procedures and may include but not be limited to the following:	• Enterprise/organizational specific co-ordination could involve:
	  • Electrical network diagrams,
	  • electrical permit to work system,
	  • other work permit system such as:
	  • work in confined space or in hazardous environment,
	  • outsourcing procedures,
	  • hazard identification,
	  • risk classification and
	  • management procedures
	• Regulatory requirements include:
	  • Occupational Health and Safety and electrical safety
	• Computer based systems can be used in the generation of:
	  • work schedules,
	  • programs and/or resource allocation

The following constants and variables included in this unit:	• Appropriate and relevant persons (see Personnel) • Appropriate authorities • Assessing risk • Assessment • Authorization • Documenting detail work events, record keeping and or storage of information • Drawings and specifications • Emergency • Environmental and sustainable energy procedures • Environmental legislation • Environmental management documentation • Established procedures • Hazards • Identifying hazards • Inspect • Legislation • Notification. • OHS practices • OHS issues • Permits and/or permits to work • Personnel • Quality assurance systems • Requirements • Work clearance systems

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices • Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Coordinating permit access authority procedures • High voltage switching principles • High voltage fault switching principles • High voltage distribution transformer principles • High voltage SWER system • Feeder automation system • System switching operations and authorization procedures - HV • System switching operations and authorization procedures - LV • High voltage overhead and substation switching principles • Low voltage overhead and substation switching Principles • High voltage switching instruction preparation • Low voltage switching instruction preparation • Enterprises specific - policies and procedure • instructions • Enterprises specific - OHS instructions • Enterprises specific - technical drawing and documents
Underpinning Skills	Demonstrates skills to: • High voltage switching practices • High voltage fault switching practices • High voltage distribution transformer practices • High voltage SWER system • Feeder automation system • High voltage switching instruction preparation • Low voltage switching instruction preparation
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: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Implement and Monitor Environmental and Sustainable Energy Management Policies and Procedures**
Unit Code	**EIS TDM5 23 0612**
Unit Descriptor	This specifies the outcomes for the collecting, interpretation and application of environmental management information, identification of environmental impacts and assessment of risks and establishment of best practice procedures for implementation of the management plans to ensure compliance. It also consists of monitoring during the implementing of, environmental and sustainable energy polices and plans and, development of modifications as part of the review process.

Elements	Performance Criteria
1. Prepare/plan to implement and monitor environmental and sustainable energy management policies and procedures	1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are obtained, analyzed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination. 1.2 Work is prioritized and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures. 1.3 Relevant requirements and established procedures for the work are to all personnel and identified for all work sites. 1.4 Hazards are identified, OHS risks assessed and control measures are prioritized, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures. 1.5 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures. 1.6 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order. 1.7 Clients/Customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements. 1.8 Liaison and communication issues with other/authorized

	personnel, authorities, clients and land owners are resolved and activities coordinated to carry out work. 1.9 Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities authorized and coordinated where applicable in accordance with established procedures. 1.10 Site is prepared according to the work schedule and to minimize OHS risk, damage to property, commerce, and individuals in accordance with established procedures. 1.11 Positioning of road signs, barriers and warning devices is planned in accordance with requirements, traffic control management requirements and established procedures.
2. Carry out the implementation and monitoring of environmental and sustainable energy management policies and procedures	2.1 OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimize waste are implemented and monitored and acted in accordance with requirements and/or established procedures. 2.2 First aid, pole top rescue and other related work procedures are performed according to requirements and/or established procedures. 2.3 Lifting, climbing, working in confined spaces, working at heights, and use of power tools/equipment, techniques and practices are safely exercised according to requirements. 2.4 Hazard warnings and safety signs are recognized and hazards and assessed OHS risks are risk control measures are implemented, preventative action taken and monitored and/or appropriate authorities consulted, where necessary, in accordance with requirements and established procedures. 2.5 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures. 2.6 Implementation and monitoring of ***environmental and sustainable energy management policies and procedures*** are carried out, in accordance with the work schedule and requirements and/or established procedures. 2.7 Essential knowledge and associated skills in the safe implementation and monitoring of environmental and sustainable energy management policies and procedures is applied to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. 2.8 Solutions to non-routine problems are identified and acted

	using acquired essential knowledge and associated skills according to requirements. 2.9 Ongoing checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality like outcome is achieved for the client/customer and to a community/industry standard.
3. Complete the implementation and monitoring of environmental and sustainable energy management policies and procedures	3.1 Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and solutions identified in accordance with established procedures. 3.2 Accidents, incidents and/or injuries are reported and followed up in accordance with requirements/established procedures. 3.3 Work site is rehabilitated, cleaned up and confirmed 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 work permit(s) are signed off and the work completed/returned to service and advised to client/customer in accordance with requirements. 3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and appropriate personnel notified.

Variable	**Range**
Environmental legislation may include:	• relevant federal legislation • relevant state/territory legislation • relevant local government by-laws • relevant government or quasi government policies and regulations • relevant community planning and development agreements (e.g. Land care agreements)
Incidents of environmental impact may include:	• emissions to air • releases to/of water • releases to land; disposal of waste • contamination of land • impact on communities • destruction of habitat • use of energy sources • waste generation processes and technologies; extraction of water

	• changes to water temperature • changes to water salinity • regulation of water flow • land use; and may involve the implementation of emergency responses
Environmental management documentation may include:	• information on applicable environmental laws or other requirements • complaint records • training records • process information • process operational log books • inspection, maintenance and calibration records • relevant contractor and supplier information • incident reports • information on emergency preparedness and response

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures • Apply sustainable energy principles and practices
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • implementing and monitoring environmental and sustainable energy management policies and procedures • Environmental fundamentals • Enterprise specific - sustainable energy principles
Underpinning Skills	Demonstrates skills to: • Power line environmental impact - implementation • and monitoring • Power line sustainable energy management – • implementation and monitoring • Enterprise specific - policies and procedure • instructions • 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. In addition to the resources listed above, in context of and specific resources for assessment, evidence should show demonstrated competence working below ground, in limited spaces, with different structural/construction types and method and in a variety of environments
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • 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 and Distribution Management Level V	
Unit Title	**Manage Project Quality**
Unit Code	**EIS TDM5 24 0612**
Unit Descriptor	This unit specifies the outcomes required to manage quality within projects. It covers determining quality requirements, implementing quality assurance processes, and using review and evaluation to make quality improvements in current and future projects.

Elements	Performance Criteria
1. Determine quality requirements	1.1 ***Quality objectives***, standards and levels are determined, with input from stakeholders and guidance of a higher project authority, to establish the basis for quality outcomes and a ***quality management plan***
	1.2 Established ***quality management methods, techniques and tools*** are selected and used to determine preferred mix of quality, capability, cost and time
	1.3 Quality criteria are identified, agreed with a higher project authority and communicated to stakeholders to ensure clarity of understanding and achievement of quality and overall project objectives
	1.4 Agreed quality requirements are included in the project plan and implemented as basis for performance measurement
2. Implement quality assurance	2.1 Results of project activities and product performance are measured and documented throughout the project life cycle to determine compliance with agreed quality standards
	2.2 Causes of unsatisfactory results are identified, in consultation with the client, and appropriate actions are recommended to a higher project authority to enable continuous improvement in quality outcomes
	2.3 Inspections of quality processes and ***quality control*** results are conducted to determine compliance of quality standards to overall quality objectives
	2.4 A quality management system is maintained to enable effective recording and communication of quality issues and outcomes to a higher project authority and stakeholders
3. Implement project quality improvements	3.1 Processes are reviewed and agreed changes implemented continually throughout the project life cycle to ensure continuous improvement to quality

	3.2 Project outcomes are reviewed against performance criteria to determine the effectiveness of quality management processes and procedures 3.3 Lessons learned and recommended ***improvements*** are identified, documented and passed on to a higher project authority for application in future projects

Variable	**Range**
Quality objectives may include:	• requirements from the client and other stakeholders • requirements from a higher project authority • negotiated trade-offs between cost, schedule and performance • those quality aspects which may impact on customer satisfaction
Quality management plan may include:	• established processes • authorizations and responsibilities for quality control • quality assurance • continuous improvement
Quality management methods, techniques and tools may include	• brainstorming • benchmarking • charting processes • ranking candidates • defining control • undertaking benefit/cost analysis • processes that limit and/or indicate variation • control charts • flowcharts • histograms • pareto charts • scatter gram • run charts
Quality control may include:	• monitoring conformance with specifications • recommending ways to eliminate causes of unsatisfactory • performance of products or processes • monitoring of regular inspections by internal or external agents
Improvements may include:	• formal practices, such as total quality management or continuous improvement • improvement by less formal processes which enhance both the product quality and processes of the project, for example client surveys to determine client satisfaction with project team performance

Evidence Guide	
Critical Aspects of Competence	A person who demonstrates competence in this unit must be able to provide evidence that they have taken responsibility for quality management of projects. This will include evidence of managing the work of others within the project team with respect to quality. Products that could be used as evidence include: documentation produced in managing projects such as: • lists of quality objectives, standards, levels and measurement criteria • records of inspections, recommended rectification actions and quality outcomes • management of quality management system and quality management plans • application of quality control, quality assurance and continuous improvement processes • records of quality reviews • lists of lessons learned and recommended improvements Processes that could be used as evidence include: • how quality requirements and outcomes were determined for projects • how quality tools were selected for use in projects • how team members were managed throughout projects with respect to quality within the project • how quality was managed throughout projects • how problems and issues with respect to quality and arising during projects were identified and addressed • how projects were reviewed with respect to quality management • how improvements to quality management of projects have been acted upon

Underpinning Knowledge and Attitudes	Broad knowledge and understanding of:
	• the principles of project quality management and their application
	• acceptance of responsibilities for project quality management
	• use of quality management systems and standards
	• the place of quality management in the context of the project life cycle
	• appropriate project quality management methodologies; and their capabilities, limitations, applicability and contribution to project outcomes
	• attributes:
	  • analytical
	  • attention to detail
	  • able to maintain an overview
	  • communicative

	• positive leadership
Underpinning Skills	Demonstrate skills of: • ability to relate to people from a range of social, cultural and ethnic backgrounds, and physical and mental abilities • project management • quality management • planning and organizing • communication and negotiation • problem-solving • leadership and personnel management • monitoring and review skills
Resources Implication	The following resources must be provided: • access to workplace documentation • real or simulated workplace
Methods of Assessment	Competence may be assessed through: • Interview/Written Test • Observation/Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the real workplace or in a simulated workplace setting

Occupational Standard: Power Transmission and Distribution Management Level V	
Unit Title	**Establish and Conduct Business Relationships**
Unit Code	**EIS TDM5 25 0612**
Unit Descriptor	This unit covers the skills, attitudes and knowledge required to manage business relationship with customers.

Elements	Performance Criteria
1. Establish contact with customer	1.1 Welcoming customer environment is maintained. 1.2 Customer is greeted warmly according to enterprise policies and procedures. 1.3 Effective service environment is created through verbal and non-verbal presentation according to enterprise policies and procedures. 1.4 Customer data is maintained to ensure database relevance and currency. 1.5 Information on customers and service history is gathered for analysis. 1.6 ***Opportunities*** to maintain regular contact with customers are identified and taken up.
2. Clarify needs of customer	2.1 Customer needs are determined through questioning and active listening. 2.2 Customer needs are accurately assessed against the products/services of the enterprise. 2.3 Customer details are documented clearly and accurately in required format. 2.4 Conduct negotiations in a business-like and professional manner. 2.5 Maximize benefits for all parties in the negotiation through use of established ***techniques*** and in the context of establishing long term relationships. 2.6 Communicate the results of negotiations to appropriate colleagues and stakeholders within appropriate timeframes.
3. Provide information and advice	3.1 Features and benefits of products/services provided by the enterprise are described / recommended to meet customer needs. 3.2 Information to satisfy customer needs is provided. 3.3 Alternative sources of information/advice are discussed with the customer.

4. Foster and maintain business relationships	4.1 Pro-actively seek, review and act upon information needed to maintain sound business relationships. 4.2 Honor agreements within the scope of individual responsibility. 4.3 Make adjustments to agreements in consultation with the customer and share information with appropriate colleagues. 4.4 Nurture relationships through regular contact and use of effective interpersonal and communication styles.

Variables	**Range**
Opportunities to maintain regular contact with customers may include:	• informal social occasions • industry functions • association membership • co-operative promotions • program of regular telephone contact
Negotiation techniques	• identification of goals, limits • clarification of needs of all parties • identifying points of agreement and points of difference • preparatory research of facts • active listening and questioning • non-verbal communication techniques • appropriate language • bargaining • developing options • confirming agreements • appropriate cultural behavior

Evidence Guide	
Critical Aspects of Competence	It is essential that competence is fully observed and there is ability to transfer competence to changing circumstances and to respond to unusual situations in the critical aspects of: • consistently applying enterprise policies and procedures and industry codes of practice in regard to customer service • providing a quality service environment by treating customers in a courteous and professional manner through all stages of the procedure • using effective questioning/active listening and observation skills to identify customer needs • communicating effectively with others involved in or affected by the work • maintaining relevant and current customer databases in accordance with enterprise policies and procedures • ability to build and maintain relationships to achieve successful business outcomes

Underpinning Knowledge and Attitudes	Demonstrate knowledge of:
	• Operational knowledge of enterprise policies and procedures in regard to:
	  • customer service
	  • dealing with difficult customers
	  • maintenance of customer databases
	  • allocated duties/responsibilities
	  • General knowledge of the range of enterprise merchandise and services, location of telephone extensions and departments/sections
	• Basic operational knowledge of legislation and statutory requirements, including consumer law, trade practices and fair trading legislation
	• Basic operational knowledge of industry/workplace codes of practice in relation to customer service
	• negotiation and communication techniques appropriate to negotiations that may be of significant commercial value

Underpinning Skills	Demonstrate skills of: • Use workplace technology related to use of customer database • Collect, organize and understand information related to collating and analyzing customer information to identify needs • Communicate ideas and information • Plan and organize activities concerning information for database entries • Use mathematical ideas and techniques to plan database cells and size • Establish diagnostic processes which identify and recommend improvements to customer service
Resources Implication	The following should be made available: • a workplace or simulated workplace • documentation, such as enterprise policy and procedure manuals relating to customer service
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation/Demonstration with Oral Questioning
Context of Assessment	Elements of competence contain both knowledge and practical components. Knowledge components may be assessed off the job. Practical components should be assessed on the job or in a simulated work environment.

Occupational Standard: Power Transmission and Distribution Management Level V	
Unit Title	**Facilitate and Capitalize on Change and Innovation**
Unit Code	**EIS TDM5 26 0612**
Unit Descriptor	This unit specifies the outcomes required to plan and manage the introduction and facilitation of change; particular emphasis is on the development of creative and flexible approaches, and on managing emerging opportunities and challenges.

Elements	Performance Criteria
1. Participate in planning the introduction and facilitation of change	1.1 ***Manager*** contributes effectively to the organization's planning processes to introduce and facilitate change 1.2 Plans to introduce change are made in consultation with ***appropriate stakeholders*** 1.3 Organization's objectives and plans to introduce change are communicated effectively to individuals and teams
2. Develop creative and flexible approaches and solutions	2.1 Variety of approaches to managing workplace issues and problems are identified and analyzed 2.2 ***Risks*** are identified and assessed, and action initiated to manage these to achieve a recognized benefit or advantage to the organization 2.3 Workplace is managed in a way which promotes the development of innovative approaches and outcomes 2.4 Creative and responsive approaches to resource management improve productivity and services, and/or reduce costs
3. Manage emerging challenges and opportunities	3.1 Individuals and teams are supported to respond effectively and efficiently to changes in the organization's goals, plans and priorities 3.2 Coaching and mentoring assist individuals and teams to develop competencies to handle change efficiently and effectively 3.3 Opportunities are identified and taken as appropriate, to make adjustments and to respond to the changing needs of customers and the organization 3.4 ***Information needs*** of individuals and teams are anticipated and facilitated as part of change implementation and management 3.5 Recommendations for improving the methods and techniques to manage change are identified, evaluated and negotiated with appropriate individuals and groups

Variables	Range
Manager	a person with frontline management roles and responsibilities, regardless of the title of their position
Appropriate stakeholders may refer to:	those individuals and organizations who have a stake in the change and innovation being planned, including: • organization directors and other relevant managers • teams and individual employees who are both directly and indirectly involved in the proposed change • union/employee representatives or groups • OHS committees • other people with specialist responsibilities • external stakeholders where appropriate - such as clients, suppliers, industry associations, regulatory and licensing agencies
Risks may refer to:	• any event, process or action that may result in goals and objectives of the organization not being met • any adverse impact on individuals or the organization • various risks identified in a risk management process
Information needs may include:	• new and emerging workplace issues • implications for current work roles and practices including training and development • changes relative to workplace legislation, such as OHS, workplace data such as productivity, inputs/outputs and future projections • planning documents • reports • market trend data • scenario plans • customer/competitor data

Evidence Guide	
Critical Aspects of Competence	Assessment must show evidence that the candidate: • Planning the introduction and facilitation of change • Developing creative and flexible approaches and solutions • Managing emerging challenges and opportunities
Underpinning Knowledge and Attitudes	• Relevant legislation from all levels of government that affects business operation, especially in regard to occupational health and safety and environmental issues, equal opportunity, industrial relations and anti-discrimination • the principles and techniques involved in: • change and innovation management • development of strategies and procedures to implement and facilitate change and innovation • use of risk management strategies: identifying hazards,

	• assessing risks and implementing risk control measures • problem identification and resolution • leadership and mentoring techniques • management of quality customer service delivery • consultation and communication techniques • record keeping and management methods • the sources of change and how they impact • factors which lead/cause resistance to change • approaches to managing workplace issues
Underpinning Skills	Demonstrate skills on: • Communication skills • Planning work • Managing risk
Resources Implication	The following resources must be provided: • Workplace or fully equipped assessment location with necessary tools, equipment and consumable materials
Methods of Assessment	Competence may be assessed through: • Interview/Written Test • 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 and Distribution Management Level V	
Unit Title	**Develop and Refine Systems for Continuous Improvement in Operations**
Unit Code	**EIS TDM5 27 1012**
Unit Descriptor	This unit of competency covers the skills, knowledge and processes required to ensure that continuous improvement systems do not stultify and continue to improve along with other operational systems in an organization. This unit is about improving the process yield/unit of effort or cost, reducing process variation and increasing process reliability, upgrading, enhancing or refining process outputs, and includes developing a culture of reviewing and sustaining change ensuring improvements are maintained and built on.

Elements	Performance Criteria
1. Establish parameters of current internal improvement systems	1.1 Describe ***organization systems*** that impact on continuous improvement 1.2 Identify current ***relevant metrics*** and their values 1.3 Check that metrics are collected for all improvements 1.4 Determine ***yield of current improvement processes*** 1.5 Review results of improvements
2. Distinguish breakthrough improvement processes	2.1 Identify all ***improvements*** which have occurred over an agreed period of time 2.2 Distinguish between ***breakthrough improvements*** and continuous improvements 2.3 Determine the timing of breakthrough improvement processes 2.4 Analyze factors controlling the ***timing*** and selection of breakthrough improvements 2.5 Analyze ***continuous improvements*** to identify cases where breakthrough improvements were required 2.6 Validate findings with process/system owners and obtain required approvals 2.7 Improve timing/selection of breakthrough improvements 2.8 Improve other factors limiting the gains from breakthrough improvements
3. Develop continuous improvement	3.1 Check that levels of delegated authority and responsibility are appropriate for continuous improvement from the shop floor

practice	3.2 Ensure all personnel have appropriate capabilities for continuous improvement processes 3.3 Ensure personnel and systems recognize potential breakthrough improvement projects 3.4 Ensure sufficient resources are available for the operation of continuous and breakthrough improvement processes 3.5 Check that relevant information flows from improvement changes to all required areas and stakeholders 3.6 Check data collection and metrics analysis capture changes which result from improvement actions 3.7 Check that improvement changes are standardized and sustained 3.8 Check review processes for routine continuous improvements 3.9 Remove or change factors limiting gains from improvements 3.10 Modify systems to ensure appropriate possible changes are referred to other improvement processes 3.11 Institutionalize breakthrough
4. Establish parameters of current external improvement system	4.1 Review ***value stream*** systems that impact on improvement 4.2 Review procedures for deciding improvement methodologies Identify current relevant metrics and their values, as appropriate 4.3 Determine yield of current improvement processes 4.4 Review results of improvements
5. Explore opportunities for further development of value stream improvement processes	5.1 Review mechanisms for consultation with value stream members 5.2 Develop mechanisms for further improving joint problem solving 5.3 Develop mechanisms for increased sharing of organizational knowledge 5.4 Obtain support and necessary authorizations from process/system owners 5.5 Capture and standardize improvements 5.6 Improve factors limiting gains from continuous improvements
6. Review systems for compatibility with	6.1 Review all systems which impact or are ***impacted on improvements*** and the improvement system 6.2 Analyze relationships between improvement systems

improvement strategy	and other relevant systems 6.3 Analyze practices caused by and results from the systems 6.4 Negotiate changes to the systems to improve the outcomes from improvement systems 6.5 Obtain necessary approvals to implement changes 6.6 Monitor the implementation of the changes

Variable	**Range**
Competitive systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • JIT, kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • overall equipment effectiveness (OEE) • takt time • process mapping • problem solving • run charts • standard procedures • current reality tree • Competitive systems and practices should be interpreted so as to take into account: – stage of implementation of competitive systems and practices – the size of the enterprise – the work organization, culture, regulatory environment and the industry sector
Code of practice and standards	Where reference is made to industry codes of practice, and/or Ethiopian/international standards, the latest version must be used

Organization systems	Organization systems may include: • problem recognition and solving • operational/process improvement • improvement projects • product/process design and development • processes for making incremental improvements
Relevant metrics	Relevant metrics include all those measures which might be used to determine the performance of the improvement system and may include: • hurdle rates for new investments • KPIs for existing processes • quality statistics • delivery timing and quantity statistics • process/equipment reliability ('uptime') • incident and non-conformance reports • complaints, returns and rejects
Process improvement yield	Improvement process yield may be regarded as: • the benefit achieved for the effort invested
Breakthrough improvements	Breakthrough improvements include: • those which result from a kaizen blitz or other improvement project or event and are a subset of all improvements
Timing of breakthrough improvements	Timing of breakthrough improvements includes: • frequency (which should be maximized) and duration (which should be minimized) of events/projects
Continuous improvement	Continuous improvement is part of normal work and does not require a special event to occur (although may still require authorizations) and contrasts with breakthrough improvement/kaizen blitz which occurs by way of an event or project
Resources for improvement	Resources for improvements include: • improvement budget • guidelines for trialing of possible improvements • mechanism for approvals for possible improvements • business case guidelines for proposed improvements • indicators of success of proposed improvement • mechanisms for tracking and evaluation of changes • forum for the open discussion of the results of the implementation • mechanisms for the examination of the improvement for additional improvements • organization systems to sustain beneficial changes
Capturing value stream improvements	Capturing value stream improvements includes: • revised contractual arrangements • revised specifications • signed agreements • other documented arrangements which formalize the raised base line

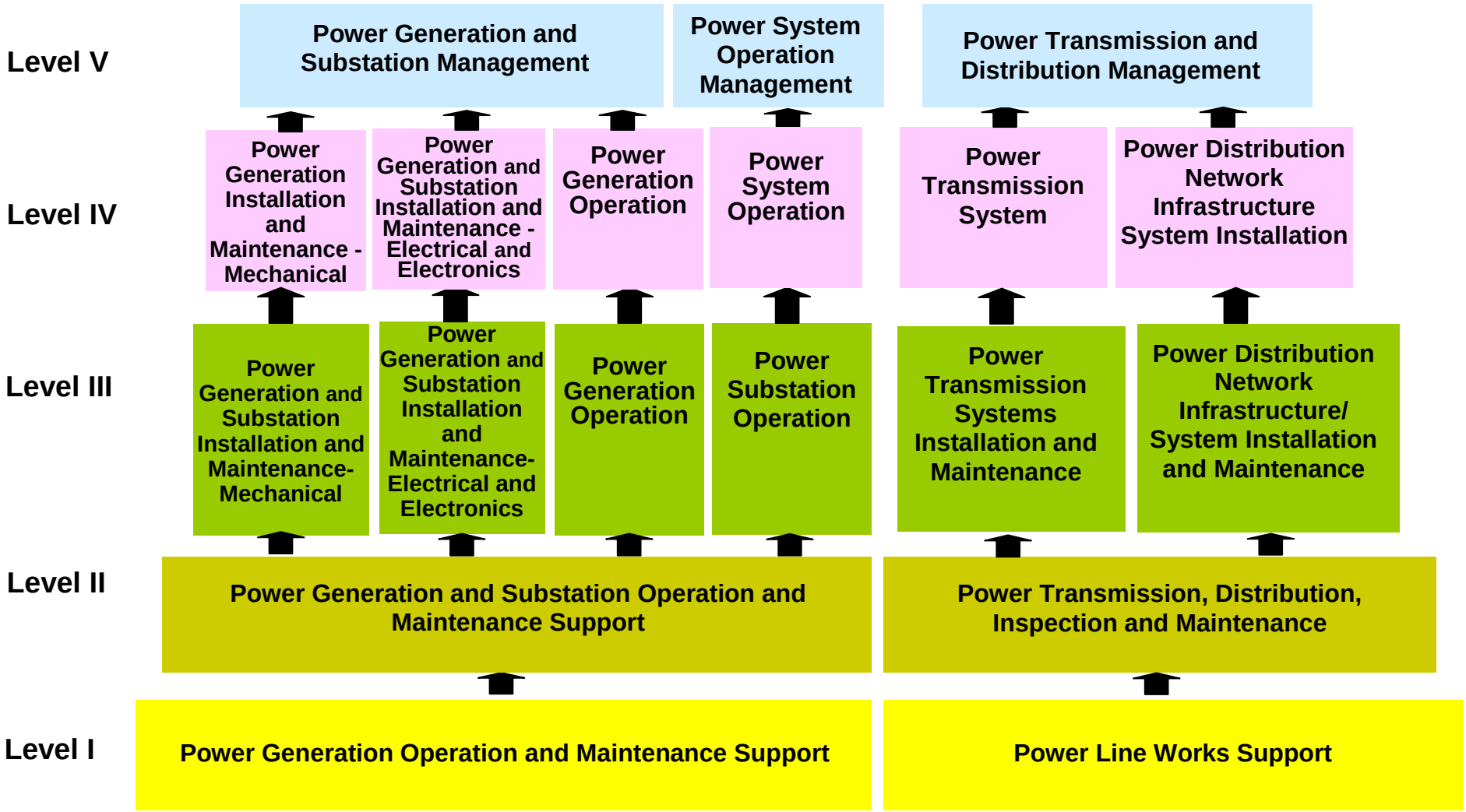
Systems impacting improvements	Systems which impact/are impacted on improvements and the improvement system include: • office • purchasing • rewards (individual or team at all levels) • sales • marketing • maintenance • process/product • transport and logistics
Organizational knowledge	Organizational knowledge should: • be able to be quantified or otherwise modified to make its outcomes measurable or observable • be able to be expressed in an accessible and distributable form appropriate to the organization operations and stakeholders
Improvements	Improvements may: • be to process, plant, procedures or practice • include changes to ensure positive benefits to stakeholders are maintained
Manager	Manager may include: • any person who may have either a permanent or an ad hoc role in facilitating the function of multiple teams in a workplace, departments or entire organizations

Evidence Guide	
Critical Aspects of Competence	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • critically review current continuous improvement processes • establish ongoing review of continuous improvement processes • implement improvements in the practice of continuous improvement • better align internal and external systems • gather data through interviews with stakeholders • review existing data • obtain additional data through a variety of techniques • communicate and negotiate at all levels within the organization
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • competitive systems and practices tools, including: • value stream mapping • 5S • Just in Time (JIT) • mistake proofing • process mapping

	• establishing customer pull • kaizen and kaizen blitz • setting of KPIs/metrics • identification and elimination of waste (muda) • continuous improvement processes including implementation, monitoring and evaluation strategies for a whole organization and its value stream • difference between breakthrough improvement and continuous improvement • organizational goals, processes and structure • approval processes within organization • cost/benefit analysis methods • methods of determining the impact of a change • advantages and disadvantages of communication media, methods and formats for different messages and audiences • customer perception of value • define, measure, analyze, improve, and control and sustain (DMAIC) process
Underpinning Skills	Demonstrates skills to: • undertaking self-directed problem solving and decision-making on issues of a broad and/or highly specialized nature and in highly varied and/or highly specialized contexts • communicating at all levels in the organization and value stream and to audiences of different levels of literacy and numeracy • analyzing current state/situation of the organization and value stream • determining and implementing the most appropriate method for capturing value stream improvements • collecting and interpreting data and qualitative information from a variety of sources • analyzing individually and collectively the implementation of competitive systems and practices tools in the organization and determining strategies for improved implementation • relating implementation and use of competitive systems and practices and continuous improvement to customer benefit • solving highly varied and highly specialized problems related to competitive systems and practices implementation and continuous improvement to root cause • negotiating with stakeholders, where required, to obtain information required for implementation and refinement of continuous improvements, including management, unions, value stream members, employees and members of the community • reviewing relevant metrics, including all those measures which might be used to determine the performance of the improvement system, including:

	– key performance indicators (KPIs) for existing processes – quality statistics – delivery timing and quantity statistics – process/equipment reliability (‘uptime’) – incident and non-conformance reports – implementing continuous improvement to support systems and areas, including maintenance, office, training and human resources
Resources Implication	Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies
Methods of Assessment	Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • suitable simulation • oral or written questioning to assess knowledge of principles and techniques associated with change management In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge
Context of Assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices.

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



Acknowledgement

We wish to extend thanks and appreciation to the many representatives of business, industry, academe and government agencies who donated their time and expertise to the development of this occupational standard.

We would like also to express our appreciation to the Experts of EEPCo, Ministry of Education (MoE) and Engineering Capacity Building Program (ECBP) who made the development of this occupational standard possible.

This occupational standard was developed on the June 2012 at Gibe, Ethiopia.