



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **UETTDRDS42A Investigate quality of power systems supply issues**

**Release: 1**

## UETTDRDS42A Investigate quality of power systems supply issues

### Modification History

Not applicable.

### Unit Descriptor

#### Unit Descriptor

#### 1) Scope:

##### 1.1) Descriptor

This Competency Standard Unit covers the technical investigation of quality of supply issues and recommending solutions. Quality of supply issues may include television and radio interference, voltage complaints, harmonics and system irregularities.

### Application of the Unit

#### Application of the Unit 2)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

### Licensing/Regulatory Information

#### License to practice 3)

The skills and knowledge described in this unit may require a licence/registration to practice in the work place subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to Occupational Health and Safety, electricity/telecommunications/gas/water industry safety and compliance, industrial relations, environmental protection, anti discrimination and training. Commonwealth, State/Territory or Local Government legislation and regulations may exist that limits the age of

**License to practice**           **3)**  
operating certain equipment.

## Pre-Requisites

**Prerequisite Unit(s)**       **4)**

**Competencies**           **4.1)**

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed plus all the competencies in one (1) of the identified Pathway Unit Group(s):

Common Unit Group

Unit Code	Unit Title
UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE104A	Solve problems in d.c. Circuits
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEE125A	Provide engineering solutions for problems in complex multiple path circuits problems
UEENEEE126A	Provide solutions to basic engineering computational problems
UEENEEG101A	Solve problems in electromagnetic devices and related circuits
UEENEEG102A	Solve problems in electromagnetic devices and related circuits

<b>Prerequisite Unit(s)</b>	<b>4)</b>	
	UEENEEG149A	Provide engineering solutions to problems in complex polyphase power circuits
	UETTDREL11A	Apply sustainable energy and environmental procedures
	UETTDREL16A	Working safely near live electrical apparatus
	UETTDNIS62A	Implement and monitor the power system organisational OHS policies, procedures and programs
	UETTDNIS63A	Implement and monitor the power system environmental and sustainable energy management policies and procedures
	UETTDARDS35A	Design overhead distribution power systems
	UETTDARDS36A	Design underground distribution power systems
	Pathway Unit Group 1	
	UETTDARDS39A	Prepare and manage detailed construction plans for electrical power system infrastructure
	UETTDARDS45A	Organise and implement ESI line and easement surveys
	Pathway Unit Group 2	
	UETTDARDS43A	Develop high voltage and low voltage distribution protection systems

**Literacy and numeracy skills 4.2)**

Participants are best equipped to achieve this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in

## Volume 2, Part 3 “Literacy and Numeracy”

Reading 5      Writing 5      Numeracy 5

**Employability Skills Information****Employability Skills      5)**

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

**Elements and Performance Criteria Pre-Content**

**6)** Elements describe the essential outcomes of a competency standard unit      Performance Criteria describe the required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the Evidence Guide.

**Elements and Performance Criteria**

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
1 Plan for and coordinate the investigation of issues in the quality of supply	<p>1.1 OHS practices/procedures and environmental and sustainable energy procedures, which may influence the investigation of issues in the quality of supply, are reviewed and determined.</p> <p>1.2 Purpose of the investigation is established and expected outcomes of the work are confirmed with the appropriate personnel.</p> <p>1.3 Organisational established procedures on policies and specifications for the investigation are obtained or established with the appropriate personnel.</p>

**ELEMENT****PERFORMANCE CRITERIA**

- 1.4 Equipment/tools and personal protective equipment are selected and coordinated based on specified requirements and established procedures.
- 1.5 Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures.
- 1.6 Risk control measures are identified, prioritised and evaluated against the work schedule.
- 1.7 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.
- 1.8 Resources including personnel, equipment, tools and 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/authorised 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 minimise 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 authorised where applicable in accordance with established procedures.
- 1.12 Positioning of road signs, barriers and warning devices is planned in accordance with requirements.

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
2 Carry out and coordinate the investigation of issues in the quality of supply	<p>2.1 Circuit/system modelling is used to evaluate alternative proposals as per established procedures.</p> <p>2.2 OHS and sustainable energy principles, functionality and practices to reduce the incidence of accidents and minimise waste are incorporated into the project in accordance with requirements and/or established procedures.</p> <p>2.3 Investigation decisions are made on the basis of safety and effective outcomes according to requirements and/or established procedures.</p> <p>2.4 Mathematical models of the quality system are used to analyse the effectiveness of the finished product/service as per requirements and established procedures.</p> <p>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.</p> <p>2.6 Essential knowledge and associated skills are applied to analyse specific data and compare it with compliance specifications to ensure completion of the project within an agreed timeframe according to requirements.</p> <p>2.7 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.</p> <p>2.8 Quality of work is monitored against personal performance agreement and/or established organisational and professional standards.</p> <p>2.9 Testing of supply quality is undertaken according to requirements and established procedures.</p>

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
3 Complete and coordinate the investigation of issues in the quality of supply	<p>3.1 Final assessments of the quality of project are undertaken to ensure they comply with all requirements and include all specifications and documentations needed to complete the supply brief.</p> <p>3.2 Appropriate personnel are notified of completion and reports and/or completion documents are finalised.</p> <p>3.3 Reports and/or completion documents are submitted to relevant personnel/organisations for approval and, where applicable, statutory or regulatory approval.</p> <p>3.4 Approved copies of quality assessment documents are issued and records are updated in accordance with established procedures.</p>



## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

**8) Essential Knowledge and Associated Skills (EKAS):** This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge has been acquired of investigating quality of supply issues.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-TDS42A      Quality of power systems supply issues

Evidence shall show an understanding of investigating the issues of the quality of power systems supply the designing of underground distribution power systems to an extent indicated by the following aspects:

T1      Detailed operation of fundamental test equipment encompassing:

- Care and safe use
- Operating principles
- Comparison of different operating principle meters used for the same purpose
- Accuracy and loading effects of meters: note; examples include measurement of voltage, current, power, resistance, insulation resistance, impedance and phase sequence and the use of oscilloscopes

T2      Detailed operation of field device test equipment encompassing:

- Care and safe use
- Operating principles
- Comparison of different operating principle meters used for the same purpose
- Accuracy and loading effects of meters: note; examples include measurement of voltage, current, power, reactive power, phase angle, resistance, inductance, capacitance, impedance, frequency, harmonics and the use of transient and data logging devices

T3      Quality of supply measures encompassing:

- Measure, analysis and provide solutions for the following; voltage variation outside of standards, voltage sags and swells, repeated fluctuations, impulses, momentary, interruptions, frequency variation and harmonics - causes, effects and methods of minimisation

## Evidence Guide

### EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the range statement of the unit of competency and the Training Package Assessment Guidelines.

The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all component parts of this unit and, performed in accordance with the Assessment Guidelines of this Training Package.

#### Overview of Assessment 9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the Industry's preferred model for apprenticeships. However, where summative (or final) assessment is used it is to include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment.

Activities associated with normal every day work have a bearing on the decision as to how much and how detailed the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practiced. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

**Critical aspects of evidence required to demonstrate competency in this unit 9.2)**

Before the critical aspects of evidence are considered all prerequisites shall be met.

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated on at least two occasions in accordance with the “Assessment Guidelines – UET12UET12”. Evidence shall also comprise:

- A representative body of Performance Criteria demonstrated within the timeframes typically expected of the discipline, work function and industrial environment. In particular this shall incorporate evidence that shows a candidate is able to:
  - Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the Performance Criteria and range; and
  - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
  - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit to such an extent that the learner’s performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
  - Demonstrate an appropriate level of employability skills; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and
- Demonstrated performance across a representative range of contexts from the prescribed items below:

<b>Range of tools/equipment/materials/procedures/workplaces/other variables</b>		
<b>Group No</b>	<b>The minimum number of items on which skill is to be</b>	<b>Item List</b>

	<b>demonstrated</b>	
A	Completing six (6) technical solutions to issues relating to the following project types:	Television and radio interference Voltage irregularities in an urban area Voltage irregularities in a rural area Voltage irregularities affecting an industrial/commercial customer Voltage irregularities in an underground area
B	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items.

### **Context of and specific resources for assessment 9.3)**

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual evaluation of quality of supply issues.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working realistic environment and a variety of conditions.

**Method of  
assessment****9.4)**

This Competency Standard Unit shall be assessed by methods given in Volume 1, Part 3 “Assessment Guidelines”.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this Competency Standard Unit applies. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and associated skills described in this unit.

**Concurrent  
assessment and  
relationship with  
other units****9.5)**

There are no recommended concurrencies for this unit.

## Range Statement

### RANGE STATEMENT

**10)** This relates to the unit of competency as a whole providing the range of contexts and conditions to which the Performance Criteria apply. It allows for different work environments and situations that will affect performance.

This Competency Standard Unit shall be demonstrated in relation to the investigation of supply issues and may include the following: distribution feeders/networks, substations, transformers, HV switchgear, LV switchgear, relevant protection systems, fuses and circuit breakers.

The following constants and variables included in the element/Performance Criteria in this unit are fully described in the Definitions Section 1 of this volume and form an integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- Assessment
- Authorisation
- 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

**RANGE STATEMENT**

- Quality assurance systems
- Requirements
- Safe design principles
- Testing procedures
- Work clearance systems

**Unit Sector(s)**

Not applicable.

**Competency Field**

**Competency Field**           **11)**  
Design.