REGISTERED
NATIONAL STANDARD

UNIT OF COMPETENCY

Title:	**Comply with scheduled and *preventative maintenance* program processes** Notes: 1) Due to safety issues inherent in working with electricity and combustible substances, all training and assessment activities must be in accordance with local industry and regulatory requirements; 2) This unit of competency has been adapted from the Pacific regional unit standard CG3003 *Comply with scheduled and preventative maintenance program processes*.

TQF Level:	3	**Credits:**	5	**Version:**	1

National standard code:	NS082-03
Associated qualification (and code):	1. National Certificate in Sustainable Energy (Energy Efficiency) Level 3; 2. National Certificate in Sustainable Energy (Biomass) Level 3; 3. National Certificate in Sustainable Energy (Solar) Level 3; 4. National Certificate in Sustainable Energy (Hybrid-wind) Level 3

Approval date:	31 August 2023	**Review date:**	31 August 2028

Purpose:

This unit describes the skills and knowledge required to ensure quality assurance and risk management compliance processes for maintenance of electro-technology aspects of plant and equipment. It encompasses:

a) working safely and to technical, quality and risk management standards, work specifications and maintenance schedules;
b) sample inspections;
c) evaluating components; and
d) completing the necessary maintenance documentation.

This unit standard is appropriate for people who are currently in the workforce in the energy sector. Persons credited with this unit standard are able to:

1. Interpret maintenance schedule requirements correctly;
2. Follow quality assurance and risk management compliance processes;
3. Follow maintenance schedules;
4. Inspect and evaluate apparatus for quality assurance and risk compliance;
5. Arrange for corrective action of non-compliant apparatus;
6. Document maintenance work.

Learning Outcome 1 (LO1)	**Prepare to comply with scheduled maintenance program processes**
Performance standards	1.1 *Occupational health and safety* (OHS) procedures for a given work area are identified, obtained and understood; 1.2 Safety *hazards* are identified, *risks* assessed, and established OHS risk *control measures* and procedures are followed; 1.3 Maintenance schedule and process *compliance* requirements are confirmed with appropriate person(s); 1.4 Maintenance work is appropriately sequenced in accordance with established procedures, and appropriate person(s) are consulted to ensure the work is coordinated effectively with others involved on the work site; 1.5 The location of equipment to be maintained is determined from maintenance schedule procedures and/or system specifications and diagrams; 1.6 Resources needed to conduct the maintenance is obtained in accordance with established procedures and checked against job requirements; 1.7 Tools, equipment and testing devices needed to conduct the maintenance are obtained in accordance with established procedures and checked for correct operation and safety.
Learning Outcome 2 (LO2)	**Comply with scheduled maintenance program processes**
Performance standards	2.1 *OHS risk control measures* and procedures for carrying out the work are followed; 2.2 Inspecting, testing, and measuring on live and/or operating systems is conducted in strict accordance with OHS requirements and workplace procedures; 2.3 Circuits/machines/plant are checked as isolated where necessary in strict accordance with OHS requirements and procedures; 2.4 Apparatus to be maintained is inspected and evaluated for compliance with requirements in accordance with maintenance schedule; 2.5 Non-compliant apparatus or components are documented and arrangements made for their rectification in accordance with established procedures; 2.6 Established methods for dealing with unexpected situations are discussed with appropriate person or persons and documented; 2.7 Ongoing checks on the quality of the maintenance are undertaken in accordance with established procedures; 2.8 Maintenance process compliance is performed efficiently without waste of materials or damage to apparatus and the surrounding environment or services using *sustainable energy practices*.
Learning Outcome 3 (LO3)	**Complete maintenance compliance process**
Performance standards	3.1 OHS risk control measures and procedures for work completion are followed; 3.2 Work site and equipment are cleaned and made safe in accordance with established

	procedures; 3.3 Final checks are made to verify that the maintenance complies with requirements; 3.4 Maintenance completion is documented and appropriate person(s) notified in accordance with established procedures.
Pre-requisites	N/A
Co-requisites	N/A
Underpinning skills and knowledge	The following knowledge and skills underpin this unit standard: a) Understanding of maintenance principles (e.g. *Preventative maintenance* (PM)), functions, systems and processes; b) *Occupational health and safety (OHS)* or *Workplace health and safety(WHS)* and safe working practices to comply with scheduled and preventative maintenance program processes; c) Skills in acquiring data and data analysis to inform and assist in the maintenance process; d) Knowledge of maintenance planning, implementation and recording.
Assessment requirements	**Methods of assessment:** A range of assessment methods should be used to assess students' knowledge and application of skills. These shall include but not restricted to the following: a) Direct observation of students performing certain tasks stated under context of assessment b) Oral questions to test relevant skills and knowledge during observation (e.g. Interviews) c) Written assessment such as: 1) Reports on specific projects- e.g. providing quotations for installation or service jobs; 2) Student Portfolios – containing other activities that demonstrate what a student can do – e.g. annotated photographs, video records, completed Activity logs, marked quizzes and assignments, etc., etc. 3) Reviews of workplace attachment reports (e.g. Supervisor/third party reports; testimonials from Project manager or supervisor) **Context of assessment:** *a) Collaboration with industry* To support student assessment and to ensure they are valid, reliable, flexible, and fair, a training provider is encouraged to make the necessary arrangements to involve industry organisations such as *Tonga Electricity Commission* (TEC), *Tonga Power Limited* (TPL) and other trusted licensed private energy and electricity entrepreneurs in the assessment of the required competencies. Such collaboration between provider institutions and the industry may include but not restricted to the following: • Experts from the industry contribute to the design and implementation of the

curriculum and assessment activities;

- Experts from the industry are engaged as trainers, assessors, or assessment moderators;
- Students are placed in relevant industry organizations for workplace attachment;
- Industry experts act as supervisors of students on workplace attachment
- Etc.

b) Assessment in context

To show that learners have the required competence they will need to demonstrate and apply their knowledge in the workplace (or in an environment that closely resembles the workplace) in relation to:

- LO1: Preparing to comply with scheduled maintenance program processes;
- LO2: Complying with scheduled maintenance program processes;
- LO3: Completing maintenance compliance processes

Examples

1. In the workplace (or in an environment that closely resembles the workplace), students could be required to:
   a) Discuss health and safety concerns that are vital during preventative maintenance work (in Oral or Written assessment);
   b) Differentiate between *Personal Protective Equipment* (PPE) and *Collective Protective Equipment* (CPE) (Oral, Written, or Observation assessment);
   c) Discuss health and safety concerns that a technician need to be mindful of when doing the maintenance tasks (Oral assessment, Written assessment);
   d) Prepare a *Preventative maintenance* (PM) summary to communicate the preventive maintenance task outlining the following:
      i. Pre-maintenance task;
      ii. Weekly checklist;
      iii. Pending tasks
      iv. New Tasks
      v. Identified defect
      vi. Suggestions for replacement or repairs in the facility.

      The following points must be taken into account during the PM tasks and while the learners are writing the summary.
      - PM Work Forecasts
      - Resource Requirement Forecast
      - Equipment Maintenance History
      - Equipment Failure Analysis

   e) Carry out an *Equipment replacement analysis*;
   f) Explain the following and identify related preventative measures;
      - Electrical Risks

	○ Work at heights ○ Isolation of equipment ○ Other concerns 2. Conduct a routine preventive maintenance check as per the routine checklist at a site that requires periodic maintenance; 3. Conduct PM duties by closing off areas under preventive maintenance using labels or "Do not operate" tags. 4. Prepare a Preventative Maintenance summary using a standard format.
Resource requirements	1. Standard classrooms with adjustable lighting; 2. Standard classroom furniture (desks and chairs for trainers and learners) 3. Text Books or printed resources on compliance with scheduled and preventative maintenance processes, at the discretion of the course/unit coordinator or trainer; 4. Resources on Preventative maintenance (PM) and Scheduling of maintenance (e.g. Printed resources such as readings and checklists, Cones, Tags, etc.); 5. *Personal protective equipment (PPE)* for electrical work: i) Cotton protective clothing with long sleeves; ii) Helmet or hard hat iii) Goggles for eye protection iv) Gloves (leather or rubber) v) Hearing protectors vi) Safety footwear 6. Computers with internet access; 7. Facility for whole-class video instruction; 8. Whiteboard and markers (or black board and chalk 9. Flip-charts or blank butcher paper for group work; 10. Permanent marking pens, pencils; **11. Learning Management System such as Moodle (optional)**
Moderation arrangements	1. Training providers must have their own moderation system approved by TNQAB before accreditation is granted; a. Relevant internal moderation processes are documented; b. Assessment is planned for each unit, and moderation processes are integrated into such plan 2. External moderation is conducted by the National qualifications unit of TNQAB for all unit components of national qualifications; a. Samples of assessed activities are submitted for moderation; b. Moderation (external) forms are available on request from the National qualifications unit of TNQAB.

Requirements to complete this unit	There are three (3) Learning outcomes and nineteen (19) Performance standards to measure competence. To satisfy the requirements for competency, the person studying this unit is: 1. Required to demonstrate all LOs to the expected standards of performance; 2. Required to attain an *Achieved* Grade (Competent) to fulfil the requirements of the Unit Standard; 3. Eligible to three (3) attempts to achieve the required competency within 14 days of the first attempt. Failure to achieve the required competency level after three (3) attempts of the exam or specific part of the assessment will require the person studying this Unit to re-enrol for the same Unit.
Important notes and definitions	**Notes:** 1. All activities associated with this unit standard must comply with the requirements of national codes of practice, regulations and legislation for workplace health, safety, and environmental protection and any subsequent amendments. 2. Assessors must comply with Tonga national assessment and moderation requirements. 3. If relevant legislations or policies are not available locally, those of New Zealand and Australia can be used for training. **Definitions:** 1. *Collective protective equipment* - is any device or system of a collective scope, intended to ensure safety and preserve the physical integrity and health of workers, as well as that of third parties. Collective measures protect more than one person at any one time. Examples: scaffolds, airbags, nets etc. and they are usually passive (i.e. they require no action by the user to work effectively); 2. *Compliance* is the state of being in accordance with established guidelines or specifications, or the process of becoming so. 3. *Control measures* (or *OHS controls or risk controls*) procedures which are put in place to decrease the likelihood or consequences from an unwanted event. 4. *Equipment replacement analysis is* analysis conducted to help the owner of a piece of equipment make the best decisions regarding equipment replacement. In such an analysis, the costs of owing an equipment in its current state is compared to the costs of owning other alternatives; 5. *Hazard* is a source or a situation with the potential for harm in terms of human injury or ill-health, damage to property, damage to the environment, or a combination of these. 6. *Occupational health and safety* (or OHS) is a multidisciplinary field concerned

	with the safety, health, and welfare of people at work; also referred to a *Workplace health and safety* (or WHS). 7. *OHS control measures* – refer to *Control measures* 8. *Personal protective equipment (PPE)* - is equipment worn to minimize exposure to a variety of hazards. Examples include such items as gloves, foot and eye protection, protective hearing devices (earplugs, muffs) hard hats, and respirators. 9. *Preventative or maintenance* (or Preventive maintenance) (PM) is the regular and routine maintenance of equipment and assets in order to keep them running and prevent any costly unplanned downtime from unexpected equipment failure. Put simply, it's about fixing things before they break 10. *Risk* refers to the chance of something happening that will have a negative effect. 11. *Risk control measures* – refer to *Control measures* 12. *Sustainable energy practices* refer to actions, behaviours, or ways of doing things in order to meet one's present needs without compromising the ability of future generations to meet their own needs.
Public comments on unit	Please contact TNQAB National Qualifications Unit (email EnquireNQ@tnqab.to or Telephone 28136) if you like to discuss or suggest changes to the details of this unit.