

**1. Module details****Module name****Substations: Basic Auxiliary Systems****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 – 40 hours.

**Module code**

NUE249

**Discipline code**

0703130

**2. Module purpose**

This module introduces the learner to basic auxiliary plant and equipment items found in a switchgear substation with an emphasis on understanding the functions and basic maintenance of this equipment rather than the physical installation of complex equipment.

**3. Prerequisites**

NE162 Electrical Principles 3.  
NE31 Electrical Drawing Interpretation and Connections.

**4. Relationship to competency standards**

This module addresses Unit 3.15 of the E.S.I. National Competency Standards for Overhead Line Work and Cable Jointing.

**5. Content****Install and maintain**

batteries  
compressor and gas systems  
fire systems  
communications and signalling equipment  
metering

**6. Assessment strategy****Assessment methods**

Short answer questions (written, oral or graphic or computer based).  
Suitable practical exercises which assess the skills required of each learning outcome.

**Conditions of assessment**

Theory room for written tests together with practical field observation.  
Learners must demonstrate competence in all learning outcomes to the standard described by the assessment criteria and perform all activities in a safe manner in accordance with State Occupational Health and Safety Acts and Regulations, Codes of Practice and Work Procedures when applicable.

## 7. Learning outcome details

### Learning outcome 1

#### Assessment criteria

### **Install and replace substation batteries.**

- 1.1 Identify and explain types of battery installations.
- 1.2 Identify and explain safety hazards related to battery installation.
- 1.3 Select and wear/use correct safety clothing/equipment.
- 1.4 Identify and isolate battery chargers and establish correct connections.
- 1.5 Install and/or replace batteries in accordance with current work practices, work procedures and manufacturer's recommendations.
- 1.6 Commission and test battery installation.
- 1.7 Reconnect a battery charger and test for correct operation.

### Learning outcome 2

#### Assessment criteria

### **Perform basic maintenance on substation fire protection equipment, gas systems, sump pumps and compressors.**

- 2.1 Identify fire protection equipment, gas systems, sump pumps and compressors on site.
- 2.2 Locate, read and interpret inspection check lists and complete on site inspections for fire protection equipment, gas systems, sump pumps and compressors.
- 2.3 Establish and explain the safety hazards related to fire protection equipment, gas systems, sump pumps and compressors.
- 2.4 Perform basic maintenance on fire protection equipment, gas systems, sump pumps and compressors in accordance with current work instructions, work procedures and manufacturer's recommendations.
- 2.5 Complete and process relevant paperwork.

**Learning outcome 3**

**Explain the basic principles and function of substation auxiliary plant.**

**Assessment criteria**

- 3.1 Locate and accurately identify basic auxiliary plant.
- 3.2 Establish and explain the safety hazards related to specific basic auxiliary plant.
- 3.3 Locate, read and accurately interpret drawings and schematic diagrams.
- 3.4 Perform HV switching and LV isolation in accordance with current work instructions and procedures when appropriate.
- 3.5 Install specific basic auxiliary plant in accordance with work instructions, work procedures, manufacturer's recommendations, drawings and schematics.
- 3.6 Perform pre-commissioning checks and tests.
- 3.7 Perform commissioning checks and tests and place equipment in service.
- 3.8 Perform plant, protection and control on load checks and process all paperwork.

**Learning outcome 4**

**Install and maintain substation communications and signalling equipment.**

**Assessment criteria**

- 4.1 Install and test bearer route.
- 4.2 Remove bearer route.
- 4.3 Complete schedules and paperwork.

**Learning outcome 5**

**Install and maintain substation metering.**

**Assessment criteria**

- 5.1 Locate and accurately identify substation metering equipment.
- 5.2 Establish and explain the safety hazards related to specific metering equipment.
- 5.3 Locate, read and accurately interpret drawings and schematic diagrams.
- 5.4 Perform HV switching and LV isolation in accordance with current work instructions and procedures when appropriate.

- 5.5 Install specific substation metering in accordance with work instructions, work procedures, manufacturer's recommendations, drawings and schematics.
- 5.6 Perform pre-commissioning checks and tests.
- 5.7 Perform commissioning checks and tests and place equipment in service.
- 5.8 Perform plant, protection and control on load checks and process all paperwork.

**8. Delivery of the module**

**Delivery strategy**

Delivery strategies must be suitable for both theoretical and/or practical learning and module purpose. It is recommended that learning and assessment be facilitated in a holistic manner which may require a learning sequence other than indicated in the body of this module descriptor.

**Resource requirements**

Enterprise substation construction manual  
 Enterprise substation maintenance manual  
 Enterprise substation design manual  
 Enterprise operation manual  
 Enterprise equipment labelling manual  
 Relevant Australian standards  
 Enterprise work manuals and standard instructions  
 Relevant manufacturers' equipment manuals  
 Electricity Supply Industry Acts and Regulations.

**Occupational health and safety requirements**

Learners should be made aware of Occupational Health and Safety issues in all situations and be expected to demonstrate safe working practices at all times. Electrical safety must be emphasised.