

**1. Module details**

**Module name**

**Substation Switching for Cable Jointers**

**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**

NUE320

**Discipline code**

0703130

**2. Module purpose**

This module covers the skills and knowledge required by cable jointers to conduct high voltage switching operations in underground or ground mounted substations in accordance with switching instructions, switching schedule and establish enterprise procedures. All procedures and practices comply with electricity supply industry standards, Supply Authority regulations, relevant Australian Standards and OH&S regulations.

**3. Prerequisites**

NUE216 Underground cable Installation  
 NUE217 Cable Jointing 1 – LV Polymeric  
 NUE219 Cable Jointing 3 – Paper/Lead

**4. Relationship to competency standards**

This module addresses Unit UETTDTRIS05A Perform substation switching to a given schedule in the ESI Transmission and Distribution Training Package

**5. Content**

Electrical Safety Rules  
 Safe work practices

System diagrams/plans, technical drawings  
 interpretation  
 analysis

De-energise and isolate  
 LV/HV testers  
 Proving de-energised  
 Earthing

Works areas and Access Permits/Authorities

Energisation

System operations  
 Switching Instructions  
 Ferroresonance  
 Substation isolators

Operating procedures and practices

Phase Rotation and Phase Out

Voltage control

System interruption reports

Types of switchgear

Circuit Breakers

Reclosers

Padmount substations

HV fuse switches

SWER

## 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.

## 7. Learning outcome details

### Learning outcome 1

**Demonstrate requirements to carry out safe work practices.**

### Assessment criteria

- 1.1 Identify requirements for Code of Practice for Electricity Distribution and Transmission, OHS Act and Electrical Safety Rules
- 1.2 Identify safe entry requirements and safe work practices for substation switching.
- 1.3 Identify hazards of working in a substation.

### Learning outcome 2

**Demonstrate knowledge of operation and use of LV/HV Testers.**

### Assessment criteria

- 2.1 Identify the operation of various types of LV/HV Testers.
- 2.2 Demonstrate the use of various types of LV/HV Testers.

### Learning outcome 3

**Identify requirements for work areas and the procedures for Access Permits/Authorities.**

### Assessment criteria

- 3.1 Demonstrate a knowledge of work areas for HV Access permit/Authority issue.
- 3.2 Demonstrate a knowledge of procedures and conditions for work under Access Permits/Authorities for work or test.

### Learning outcome 4

**Demonstrate knowledge of operation and use of LV/HV Testers.**

### Assessment criteria

- 4.1 Demonstrate a knowledge of the requirements and procedures for System Operations.
- 4.2 Identify the various types of diagrams used, symbols and abbreviated terms.

<b>Learning outcome 5</b>	<b>Identify and requirements for and demonstrate de-energisation and isolation.</b>
<b>Assessment criteria</b>	<p>5.1 Demonstrate a knowledge of the minimum safe work distances from HV apparatus.</p> <p>5.2 Identify and demonstrate the process/techniques used to de-energise and isolate substation switching apparatus and the precautions to be taken.</p> <p>5.3 Demonstrate a knowledge of the various types of apparatus encountered by and Authorised Switching person to carry out isolation on HV apparatus.</p>
<b>Learning outcome 6</b>	<b>Identify and demonstrate procedures to prove HV apparatus is de-energised and apply earthing equipment to isolate apparatus for the purpose of making the apparatus safe for work.</b>
<b>Assessment criteria</b>	<p>6.1 Identify the process for isolation and earthing of HV apparatus to make apparatus safe for work.</p> <p>6.2 Identify steps to be taken when proving HV apparatus de-energised.</p> <p>6.3 Demonstrate an understanding of the requirements of earthing and the difference between Access Permit/Authority Earths and Working earths</p>
<b>Learning outcome 7</b>	<b>Identify the requirements to energise HV apparatus.</b>
<b>Assessment criteria</b>	<p>7.1 Identify the steps to be taken to remove isolation and prepare HV apparatus for energisation.</p> <p>7.2 Demonstrate the correct techniques to energise HV apparatus and the types of tests that may be used on HV apparatus prior to placing the HV apparatus in service.</p>
<b>Learning outcome 8</b>	<b>Identify the requirements to prepare outage requests and to prepare switching instructions for HV transmission and distribution systems.</b>
<b>Assessment criteria</b>	<p>8.1 Identify the process for requesting an outage for work on apparatus</p> <p>8.2 Demonstrate a knowledge of the process for developing a switching instruction.</p>
<b>Learning outcome 9</b>	<b>Demonstrate knowledge of the reasons for and tests associated with Phase Rotation and Phase Out.</b>

<b>Assessment criteria</b>	<p>9.1 Identify the reasons for and procedures for Phase Rotation.</p> <p>9.2 Identify the reasons for and procedures for Phase Out.</p>
<b>8. Delivery of the module</b>	
<b>Delivery strategy</b>	<p>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.</p>
<b>Resource requirements</b>	<p>Enterprise construction manuals          System plans/diagrams          Relevant Australian standards          Enterprise work manuals and standing instructions          Enterprise procedures          Relevant manufacturers' equipment/component manuals          Range of materials/components          Appropriate site layout          Test equipment          Range of tools          Safety equipment</p> <p><i>WorkCover NSW, WorkCover Code of Practice - Low Voltage Electrical Work Local electricity distributor and authority regulations, or State/Territory equivalent</i></p> <p>Where this module is used in an approved Traineeship or Apprenticeship program learners should be advised to obtain, where available, respective EE-Oz Training Standards<sup>1</sup> <b>User Guides</b> (these outline in detail what training and work performance the Learner is required to undertake for the program).</p>
<b>Occupational health and safety requirements</b>	<p>Students 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.</p>

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<sup>1</sup> EE-Oz Training Standards is an ANTA declared Industry Skills Council for the ElectroComms and EnergyUtilities Industry