

Substation Maintenance Instruction

Isolating transformers

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SUBSTATION MAINTENANCE INSTRUCTION

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1.0 PURPOSE

To set out in detail the broad maintenance requirements for isolating transformers installed in Endeavour Energy's transmission and zone substations and switching stations.

2.0 SCOPE

This instruction outlines the broad maintenance requirements for oil and dry isolating transformers. It is to be read in conjunction with Substation Maintenance Instruction SMI 100 – Minimum requirements for maintenance of transmission and zone substation equipment.

3.0 REFERENCES

Internal

Company Policy (Network) 9.9.1 – Network Asset Maintenance
Company Procedure GSY 1066 – Worksite Hazard and Risk Assessment
Environmental Management Standard EMS 0007 – Waste management
Substation Maintenance Instruction SMI 100 – Minimum requirements for maintenance of transmission and zone substation equipment
Substation Maintenance Instruction SMI 119 – Transmission and zone substation data asset structure and nameplate details
Substation Maintenance Instruction SMI 124 – Maintenance data entry and defect prioritisation
Electrical Safety Rules
Annexure 1: Maintenance Schedules – Isolating Transformers

External

Electricity Supply Act 1995 (NSW)
Electricity Supply (Safety and Network Management) Regulation 2014
Work Health and Safety Act 2011 (NSW)
Work Health and Safety Regulation 2017 (NSW)
AS 5577 – 2013 – Electricity network safety management systems
ENA National Electricity Network Safety Code (Doc 01-2008)
National Electricity (NSW) Law 1997
National Electricity Rules

4.0 DEFINITIONS AND ABBREVIATIONS

Dry-type transformer

A transformer of which the core and windings are not immersed in an insulating liquid.

Ellipse

Endeavour Energy's asset database

Isolating transformer

Transformer with electrical separation between the input and output windings.

5.0 ACTIONS

5.1 General

The routine maintenance required for isolating transformers comprises an in-service inspection and an exercise.

As a minimum requirement, routine maintenance must always be carried out in accordance with manufacturer's recommendations. Distinct types or brands of equipment may not contain some of the components listed for routine maintenance, in which case that particular component is to be disregarded.

Before any maintenance is performed, a search of any open defects on the asset must be carried out. If any open defects exist, these must be rectified during the maintenance. In-service inspections are to include the repair of simple defects that can be easily and safely rectified and take less than 15 minutes for all work.

All defects found during routine maintenance or in-service inspections must be recorded in Ellipse in accordance with Substation Maintenance Instruction SMI 124 – Maintenance data entry and defect prioritisation and Substation Maintenance Instruction SMI 119 – Transmission and zone substation data asset structure and nameplate details.

For the asset on which the maintenance work is being performed, the nameplate data that has been recorded in Ellipse must be confirmed. Nameplate data that has not been recorded in Ellipse must be captured in accordance with requirement SMI 119 and entered into asset management database.

Records of the exercising of the isolation transformer must be recorded in 'G:\EE Maintenance\Transmission\' under the relevant substation.

5.2 Routine Maintenance Requirements

Distinct types or brands of isolating transformers may not contain some of the components listed for routine maintenance, in which case that particular component is to be disregarded.

The set of maintenance requirements for isolating transformers is outlined in the maintenance schedule provided in Annexure 1 of this instruction, which includes visual in-service inspection and exercise.

The function of isolating transformer is to provide back-up ac supply to substation in the event of unavailability of main supply source (usually auxiliary transformer). The ac supply changeover from main to back-up should be automatic via AC changeover system. During exercise the function of AC changeover is verified such that back-up ac supply is available, when required.

6.0 AUTHORITIES AND RESPONSIBILITIES

Manager Asset Standards & Design has the authority and responsibility for approving the amendments to this Standard in accordance with GAM0001.

Substation Assets Manager has the authority and responsibility for keeping the content of this Standard up to date.

All Regional Transmission Managers have the authority and responsibility for:

- overseeing that Endeavour Energy employees engaged to perform the work have appropriate qualifications and are competent to carry out the work;
- monitoring isolating transformers at transmission and zone substations so that they are maintained to the requirements of this instruction and Substation Maintenance Instruction SMI100 – Minimum requirements for maintenance of transmission and zone substation equipment; and
- providing appropriate equipment and training.

Endeavour Energy employees and/or contractors have the authority and responsibility for:

- conducting themselves in a manner that meets the requirements of this instruction and Substation Maintenance Instruction SMI 100 – Minimum requirements for maintenance of transmission and zone substation equipment;
- working in accordance with local and statutory requirements;
- managing public safety so that it is not compromised; and
- working in accordance with Endeavour Energy's Electrical Safety Rules.

7.0 DOCUMENT CONTROL

Documentation Content Coordinator : Substation Assets Manager

Documentation Distribution Coordinator : Standards & Process Administrator

Annexure 1: Maintenance Schedules - Isolating Transformers

A. VISUAL-IN-SERVICE INSPECTION

ROUTINE MAINTENANCE SCHEDULE	
Visual In-service inspection: Isolating transformers (Oil filled transformers)	
1.1	Visually inspect the equipment in general, check and note any defects.
1.2	Inspect tank for oil leaks and check oil level. Note: If a major leak is detected, raise a defect and confirm that sufficient oil will remain in the transformer until repairs can be carried out, taking into account any possible drop in temperature. If oil needs to be topped up, new transformer oil must be used. Care should be taken to confirm that no solid or liquid contaminants or moisture enters the tank.
1.3	Inspect tank for rust, corrosion, poor paintwork condition or other defects.
1.4	Inspect cable box seals for any defects.
1.5	Inspect all bushings for treeing, tracking, burn marks visible effects of corona, cracks, scratches or other defects.
1.6	Inspect primary terminals, joints for burn mark, contamination or other defects.
1.7	Inspect earthing connections between main tank and earth.
1.8	Inspect neutral connection for any defects
1.9	Check labels/signs are legible and correctly fitted.
1.10	Capture the nameplate data that has not been recorded or incorrectly entered in Asset Management Database and update accordingly.

ROUTINE MAINTENANCE SCHEDULE	
Visual In-service inspection: Isolating transformers (dry type transformers)	
1.1	Visually inspect the equipment in general, check and note any defects.
1.2	Inspect tank for rust, corrosion, poor paintwork condition or other defects.
1.3	Inspect cable box seals for any defects.
1.4	Inspect all bushings for treeing, tracking, burn marks visible effects of corona, cracks, scratches or other defects.
1.5	Inspect primary terminals, joints for burn mark, contamination or other defects.
1.6	Inspect earthing connections between main tank and earth.
1.7	Inspect neutral connection for any defects
1.8	Check labels/signs are legible and correctly fitted.
1.9	Capture the nameplate data that has not been recorded or incorrectly entered in Asset Management database and update accordingly.

B. EXERCISE

ROUTINE MAINTENANCE SCHEDULE	
Exercise: Isolating transformers (dry type transformers)	
1.1	Check that the change-over to street supply functions correctly. Report any failure and record defect against relevant asset in Asset Management Database.

ROUTINE MAINTENANCE SCHEDULE	
Exercise: Isolating transformers (oil filled transformers)	
1.1	Check that the change-over to street supply functions correctly. Report any failure and record defect against relevant asset in Asset Management Database.