

Document No: SMI 152

Amendment No: 6

Substation Maintenance Instruction

Auxiliary Transformers

IMPORTANT DISCLAIMER

As the information contained in this publication is subject to change from time to time, Endeavour Energy gives no warranty that the information is correct or complete or is a definitive statement of procedures. Endeavour Energy reserves the right to vary the content of this publication as and when required. You should make independent inquiries to satisfy yourself as to correctness and currency of the content. Endeavour Energy expressly disclaims all and any liability to any persons whatsoever in respect of anything done or not done by any such person in reliance, whether in whole or in part, on this document.

Copyright © Endeavour Energy 2016

Substation Maintenance Instruction

ASSET STANDARDS & DESIGN

Document No	:	SMI 152
Amendment No	:	6
Approved By	:	GMAM
Approval Date	:	31/03/16
Review Date	:	31/03/19

SMI 152 AUXILIARY TRANSFORMERS

CONTENTS

1.0	PURPOSE.....	3
2.0	SCOPE	3
3.0	REFERENCES.....	3
4.0	DEFINITIONS AND ABBREVIATIONS.....	3
5.0	ACTIONS.....	3
5.1	General Requirements.....	3
5.2	Routine maintenance schedule	4
6.0	AUTHORITIES AND RESPONSIBILITIES.....	6
7.0	DOCUMENT CONTROL	7

1.0 PURPOSE

This instruction outlines the broad maintenance requirements for auxiliary transformers.

2.0 SCOPE

The scope of this instruction includes the maintenance requirements for auxiliary substations. It is to be read in conjunction with SMI 100 for transmission and zone substation equipment.

3.0 REFERENCES

Internal

- Board Policy 3.0 – Work Health and Safety
- Board Policy 4.0 - Environment
- Company Policy 9.9.1 - Network Asset Maintenance
- Endeavour Energy Electrical Safety Rules
- Network Management Plan December 2013 Review
- Substation Maintenance Instruction SMI 100 - Minimum requirements for maintenance of transmission and zone substation equipment
- Substation Maintenance Instruction SMI 103 – Insulation oil testing
- Substation Maintenance Instruction SMI 118 - Transmission and zone substation maintenance data entry and defect prioritisation
- Substation Maintenance Instruction SMI 119 - Transmission and zone substation data entry, asset structure and details
- Substation Maintenance SMI 156 – Breathers

External

- ENA National Electricity Network Safety Code (Doc 01-2008)
- *Work Health and Safety Act 2011*
- *Work Health and Safety Regulation 2011*
- AS/NZS 60076.3:2008 – Power transformers Part 3: Insulation levels, dielectric tests and external clearances in air (IEC 60076-3, Ed. 2 (2000) MOD)

4.0 DEFINITIONS AND ABBREVIATIONS

SMI Substation Maintenance Instruction

Auxiliary transformers A transformer that provides supply for the auxiliary services (lighting, low voltage power, air conditioning etc) in a substation

5.0 ACTIONS

5.1 General Requirements

The routine maintenance requirement for auxiliary transformers comprises an inspection and a major overhaul.

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

The in-service inspection is to include the repair of simple defects and abnormalities that can be easily and safely rectified. These defects must be raised with a separate and individual work order.

All defects and abnormalities found during routine maintenance are to be recorded in Ellipse. Full details regarding reporting of defects are contained in SMI118 - Transmission and zone substation maintenance data entry and defect prioritisation.

Oil test results shall be stored in *G:\oildata* and the insulation resistance test results shall be stored on the network drive, in *G:\EE Maintenance\Transmission*

5.2 Routine maintenance schedule

Routine maintenance
1.0 INSPECTION
Tank
Check oil level
Inspect for oil leaks or spillage
Inspect for rust, corrosion, poor paintwork condition or other defects
Inspect cable box seals
Cage (where fitted)
Inspect gate and fence condition
Inspect locking condition
Earthing
Inspect connection to main tank
Inspect neutral connection
Breather (where fitted)
Carry out breather inspection in accordance with breather maintenance instruction SMI 156 - Breathers
Bushings (primary and secondary)
Inspect bushings for treeing, tracking, visible effects of corona, cracks, scratches or other defects
Labels
Check labels/signs are legible and correctly fitted
Ellipse Data Validation:
Confirm the nameplate data which already exists in Ellipse
Capture the nameplate data that does not exist in Ellipse and update Ellipse
2.0 MAJOR OVERHAUL
Carry out inspection as per section 1.0
2.1 As found checks
Sample tank oil and test in accordance with SMI 103 – Insulation oil testing
2.2 Overhaul
Bushings
Clean with recommended solvent
Breather

Carry out breather maintenance in accordance with breather maintenance instruction SMI 156 - Breathers
Explosion vent / Pressure relief device
Check condition and inspect for oil leaks
Connections (primary and secondary)
Check connection tightness
Cable box
Clean housing
Earthing
Check tightness of main tank connections
Check tightness of neutral connection
Fuse links
Check conditions and confirm ratings
Oil Level
Check oil level. There shall be sufficient oil in the transformer to last until the next scheduled maintenance. Note: <i>If oil needs to be topped up, only new transformer oil shall be used. Care shall be taken that no solid or liquid contaminants or moisture enters the tank</i>
2.3 Tests
Insulation resistance
Record the following temperatures during the insulation resistance test: - Ambient temperature; - The top of the transformer; and, - The bottom of the transformer
Record insulation resistance, after one (1) minute, at 2.5kV dc between: - Primary to secondary and earth; and, - Secondary to primary and earth Adjust insulation resistance value and compare with the minimum insulation resistance value. Comparison should be made to previous results to establish a trend. Note: <i>After the test has been completed, all terminals shall be grounded for at least 10 minutes to allow any trapped charges to decay to a negligible value.</i>

6.0 AUTHORITIES AND RESPONSIBILITIES

General Manager Asset Management has the authority and responsibility for approving this instruction.

Manager Asset Standards & Design has the authority and responsibility for making recommendations to the **General Manager Asset Management** in respect to this instruction.

Network Maintenance Manager has the authority and responsibility for keeping the content of this instruction up to date.

The **Regional Transmission Manager** has the authority and responsibility for:

- confirming Endeavour Energy employees and/or contractors engaged to perform the work have appropriate qualifications;
- confirming that employees are conversant with, and work in accordance with, the Electrical Safety Rules;
- meeting the requirements of this standard;
- prioritising and performing the work in accordance with this standard; and
- checking the appropriate maintenance details and test results are entered into the Ellipse database as part of the maintenance process.

All Endeavour Energy employees and contractors have the authority and responsibility for:

- working in accordance with local and statutory requirements;
- recording maintenance and test data in Endeavour Energy's electronic databases;
- maintaining a high level of public safety;
- working in accordance with Endeavour Energy's Electrical Safety Rules; and
- communicating abnormalities found in the transformer to the Regional Transmission Manager and the Network Maintenance Manager and Network Substation Manager, Asset Standards & Design.

The **Oil sampling technologist** or contractors have the authority and responsibility for:

- obtaining oil samples in accordance with clause 5.4 in SMI 103;
- handling, storing, disposing of and transporting the oil in accordance with Company Procedures;
- delivering oil samples to Endeavour Energy's testing laboratory within five (5) days; and,
- updating the Endeavour Energy Ellipse maintenance database to indicate that an oil sample was taken and tested.

Oil testing technologists have the authority and responsibility for:

- testing oil samples received at the laboratory in accordance with SMI 103;
- testing oil samples within ten (10) days of the sample being taken;
- handling, storing, disposing of and transporting the oil in accordance with Company Procedures; and
- identifying potential problems with equipment based on oil sample results;

7.0 DOCUMENT CONTROL

Documentation Content Coordinator : Network Maintenance Manager

Documentation Distribution Coordinator : Branch Process Coordinator