

Substation Maintenance Instruction

Pole substations

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SUBSTATION MAINTENANCE INSTRUCTION

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SMI 107 Pole substations

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1.0 PURPOSE

To set out the broad maintenance requirements for pole mounted substations.

2.0 SCOPE

This instruction outlines the broad maintenance requirements for pole mounted substations.

It is to be read in conjunction with SMI 101 for distribution substations.

3.0 REFERENCES

- Company Policy 9.9.1 - Network Asset Maintenance
- *Electricity Supply Act 1995* (as amended)
- ENA National Electricity Network Safety Code (Doc 01-2008)
- Endeavour Energy Electrical Safety Rules
- *Work Health and Safety Act 2011*
- *Work Health and Safety Regulation 2011*
- Endeavour Energy Network Management Plan 2011-2013
- Substation Maintenance Instruction SMI 101 – Minimum requirements for maintenance of distribution equipment
- SMI 112 – Distribution data entry - maintenance and defect prioritisation
- Regional form FRG 1538 – Network asset operations installation and maintenance data sheet

4.0 DEFINITIONS AND ABBREVIATIONS

MDI	Maximum demand indicator
Ellipse	Endeavour Energy's asset database

5.0 ACTIONS

5.1 General requirements

This routine maintenance requirement for pole substations comprises of a non intrusive in-service inspection of the tank, insulation, bushings, cables, support structure, fuses, earthing and indication equipment.

In-service inspections are to include the repair of simple defects and abnormalities that can be easily and safely rectified and take less than 15 minutes for all work.

All defects and abnormalities found during routine maintenance are to be recorded in Ellipse.

For the asset on which the maintenance work is being performed, the nameplate data that has been recorded in Ellipse shall be confirmed. Nameplate data that has not been recorded in Ellipse shall be captured and entered into Ellipse.

5.2 General work or cutouts

When maintenance work is to be carried out on existing pole substations, or replacement of the transformer, the opportunity shall be taken to replace the following components, if not already completed, in accordance with the relevant work:

- DOFs - change all 3 to the approved polymeric insulator.
- Surge/lightning arresters - Change all three (3) to 10kA polymeric type.

- If surge arresters are located at the top of a pole on the incoming line, they should be moved down adjacent to the transformer.
- Install new style vermin proof caps to surge arresters and transformer bushings.
- MDIs
 - If the transformer is a three (3) phase unit, without MDIs, fit CTs and MDI.
 - If the transformer is not a three (3) phase unit, and the MDI unit is broken, do not fix or replace MDI, but remove and short circuit the CTs.

5.3 Transformer change

When installing a replacement transformer, the following work shall be carried out:

- The minimum clearance to the road from the base of transformer is achieved.
- Install stainless steel bolts on pole bolt transformers or pole bolt hanging brackets.
- If the existing stainless steel bolt is branded on the head as **HXH**, the bolts shall be replaced with new units.
- Apply the special nickel based lubricant (**stockcode 1555101**) to the threads to prevent gauling of stainless steel nuts and bolts.
- If not already installed, a safety chain, to Endeavour Energy's current standard, shall be fitted between the pole and the transformer lifting lug.

When installing lid mounted bushing transformers the following should be carried out:

- HV dropper support arm installed (approx 1.8m) shall allow a clearance of 800mm from the pole for both 22kV and 11kV.
- The earthed safety barrier is installed.
- When the LV links are open, a clearance of greater than 800mm from the HV to LV links is maintained.
- Connect dropper to surge diverter first and then loop to transformer.

5.4 Routine maintenance schedules

Routine maintenance
1.0 INSPECTION
General
Inspect labels/signs are legible and correct/replace where required
MDI
Inspect MDI is operating and readable
Inspect MDI housing for damage.
Insulators
Inspect insulators for damage or cracks
Steelwork/Hardware/Platform
Inspect for rust, corrosion, poor paintwork condition or other defects
Install a safety chain if not already installed.
Tank
Inspect for signs of oil active leaks
Check oil levels
Inspect paintwork condition, and for significant rust.
Bushings/Arresters
Inspect condition for cracks, pollution, signs of tracking or other defects
Shrouds
Inspect condition for pollution, tracking or other defects
Cables
Inspect condition of HV dropper cable insulation
Inspect condition of LV cable and connections
Links
Inspect condition of fuse links and/or transformer links for tracking, burning or other defects
Cross arm structure
Inspect for cracks, rot or other defects
Earthing
Visible connections and conductor
Inspect connections and conductor for security and condition
Earth batten
Inspect condition for looseness, cracks, rot or other defects
Drop out Fuses
Inspect condition for tracking, water damage, discolouration or other defects
Where spark catchers/arrestors are installed on the fuses, a defect shall be raised and the complete drop out fuse assembly shall be replaced.

Routine maintenance
<i>Ellipse Data Validation:</i>
Confirm nameplate data which already exists in Ellipse.
Capture the nameplate data that does not exist in Ellipse and update Ellipse.

6.0 AUTHORITIES AND RESPONSIBILITIES

The **Chief Engineer** has the authority and responsibility for approving this instruction.

The **Manager Primary Systems** has the authority and responsibility for making recommendations to the Chief Engineer in respect to this instruction.

The **Network Maintenance Manager, Primary Systems** is responsible for keeping the content of this instruction up to date.

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

- Confirming Endeavour Energy staff and/or contractors engaged to perform the work have appropriate qualifications.
- Confirming that staff 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.
- Checking the appropriate maintenance details are entered into the Ellipse database as part of the maintenance process.

All Endeavour Energy staff and contractors are responsible 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.

7.0 DOCUMENT CONTROL

Documentation content coordinator: Network Maintenance Manager, Primary Systems

Documentation process coordinator: Standards Process Coordinator