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Standard for Operating Practices – Work Involving the Energex Low Voltage Network

Contents

1. Overview

1.1 Purpose

This Standard forms part of Energex's safe system of work and outlines key roles, responsibilities and procedures for all persons switching or working on the de-energised Energex Low Voltage (LV) distribution network.

This Standard details the requirements to isolate, test to prove de-energised and issue Permits/Notices as well as the responsibilities of all persons involved in the LV switching process.

This Standard should be read in conjunction with *Plan Network Switching 2951504*; *Coordinate Network Switching 3053853*, *Electrical Safety Rules (ESR) - 6503074* and current work practices.

1.2 Scope

This Standard applies to:

- Connection and energisation of any new entity owned LV electrical apparatus to the Energex LV distribution network
- Planned and emergency LV switching of the Energex LV distribution network
- All persons working on or near the de-energised Energex LV distribution network
- Disconnected/abandoned LV apparatus left in situ.

This Standard does not apply to:

- Customer connections work (initial energisation of customer installation or testing correctness of network connections following Energex or customer work for example) for which other safe work documentation shall be followed
- Work on LV apparatus in substations without a connection to the Energex LV distribution network
- Live work on the Energex LV distribution network.

2. References

2.1 Legislation, Regulations, Rules, and Codes

ENA DOC 003 – 2021 National Guidelines for Safe Access to Electrical and Mechanical Apparatus

2.2 Energy Queensland Controlled Documents

Queensland Electricity Entity Standard for Safe Access to HV Electrical Apparatus (SAHV – Orange Book) - 2904212
Electrical Safety Rules (ESR) - 6503074
Co-ordinate Network Switching - 3053853
Plan Network Switching - 2951504
NECF Handbook - 13432141
R323 Live Parts Safe Work Method Statement - 1887674
R326 Radio Frequency Radiation Safe Work Method Statement - 1887850
Standard for Personal Protective Equipment (PPE) S031 - 691352
Field Switching Record - 7282337
WCS31 - Commissioning Operating and Accessing the Network - 13260278
Low Voltage Work Permit - 27058565
Low Voltage Fault Finding Permit - 13615542
Customer Isolation Notice - 6759316
Third Party Non-Contact Notice - 6741466

3. Definitions and Abbreviations

3.1 Definitions

Do Not Operate Board (DNOB) a safety sign bearing the words 'Do Not Operate' used to identify Isolation Points or Operator Earths.

Emergency Switching immediate switching for safeguarding personnel, preventing damage to electrical apparatus, restoring supply or providing access for emergency repair of electrical apparatus.

High Voltage (HV) a voltage greater than 1000 V AC RMS or 1500 V ripple-free DC.

Low Voltage (LV) a voltage greater than 50 V AC RMS or 120 V ripple-free DC, but not more than 1,000 V AC RMS or 1,500 V ripple-free DC.

Low Voltage Outage Coordinator (LVOC) a trained role that coordinates switching and approves the issue of LV Work/Fault Finding Permits.

Low Voltage Outage Officer (LVOO) an authorised role that checks LV switching sheets and authorises and coordinates LV switching sheets in certain situations.

Low Voltage Switching Operator (LVSO) an authorised role that can operate LV switching devices required to safely de-energise or parallel a LV feeder.

Responsible Person a person to whom a Low Voltage Work Permit or Low Voltage Fault Finding Permit is issued and is the person responsible for compliance with the requirements of that Permit.

3.2 Abbreviations

AMS	Application Management System.
AP	Access Permit.
DNOB	Do Not Operate Board.
ESR	Electrical Safety Rules.
HV	High Voltage.
LV	Low Voltage.
LVOC	Low Voltage Outage Coordinator.
LVOO	Low Voltage Outage Officer.
LVSO	Low Voltage Switching Operator.
NAP	Network Attachment Points.
NECF	National Energy Customer Framework.
NMI	National Metering Identifiers.
SAHV	Queensland Electricity Entity Standard for Safe Access to HV Electrical Apparatus
WP	Low Voltage Work Permit.

4. Roles and Responsibilities

Roles and Responsibilities are to be read in conjunction with *Plan Network Switching - 2951504*; *Co-ordinate Network Switching - 3053853*, *Electrical Safety Rules (ESR) - 6503074* and current Work Practices.

4.1. Application

When switching of the Energex LV distribution network is required, the Applicant shall submit an application in the Application Management System (AMS) program and shall:

- Scope the job requirements in consultation with the LV Outage Officer (LVOO) to ensure all necessary requirements for switching the Energex LV distribution network are satisfied:
  - In the field, check the correctness of LV network configuration, switching points and isolation points and ensure suitable selection of continuity of supply measures - LV ties (*Section 6.1.*), LV generators or planned outages (e.g. confirm Network Attachment Points (NAP), extent of customer interruptions, LV generator connection points/sites)
  - Determine the effect the LV switching will have on surrounding distribution transformers and LV circuits e.g. avoiding overload situations/voltages outside of statutory limits
  - Notify the LVOO of any discrepancies found between EnerGISe/diagrams and the LV network configuration in the field.
- Ensure that all information including isolation points, outage details, clash information and description of the intended work is entered
- Ensure that any specific LV tie requirements (e.g. a specific tie that must be closed and remain closed to maintain generator synchronism with the LV network or continuity of supply) are included in any associated High Voltage (HV) application (*Section 6.1.*)
- Include any additional information/other remarks ('Notes' section of AMS application) that are relevant to the scheduling, writing, authorisation and completion of the switching (e.g. any associated HV application)
- Include other remarks if there is a requirement to work on an isolation point common to both a HV and LV application (*Section 8.6.*)
- Confirm customer interruption notification has occurred in accordance with National Energy Customer Framework (NECF) Training and customer data is correct (i.e. all National Metering Identifiers (NMIs) interrupted are listed and mapped to the correct transformer).

Where an Energex Applicant has entered an application on behalf of others (Non-Energex) they take responsibility for ensuring these requirements have been met and correctly recorded.

4.2. Switching Sheet Writing

All switching sheets shall be written in the standard electronic format except for certain circumstances, in consultation with the LVOO. Hand-written switching sheets shall be legible and use the standard terminology and formatting used in electronic formats (*Field Switching Record - 7282337*).

The Switching Sheet Writer shall ensure the switching sheet:

- Satisfies the intent of the application
- Is written in a logical sequence
- Is electrically correct i.e. isolation, continuity of supply, testing and phasing/rotation as required
- Contains any Permit/Notice details, including work area and all work details
- Is submitted a minimum 5 business days prior to the day of switching (switching sheets submitted late can be authorised but only in exceptional circumstances and in consultation with the LV Outage Coordinator (LVOC)):
  - 2 business days required for checking
  - 3 business days required for authorising and activation.

  Where work is being completed by Accredited Energex Service Providers, the notification requirements specified in *WCS31 - Commissioning Operating and Accessing the Network - 13260278* are to be complied with.
- Status is updated in AMS to 'Field Checked' only after the field checking of switching points and check to confirm the correctness of LV network configuration/NAPs.
- Any discrepancies found between EnerGISe/diagrams and the LV network configuration/NAPs/NMIs in the field, are to be noted in the AMS application, as well as being communicated to Data Help for updating of records.

4.3. Switching Sheet Checking

With the exception of emergency switching, switching sheets are not to be written and checked by the same person.

The Switching Sheet Checker shall:

- Check all details of planned LV switching applications and switching sheets. This includes:
  - Planned LV switching sheets written in electronic formats
  - Planned hand-written switching sheets (*Field Switching Record - 7282337*).
- Verify the application's continuity of supply details (i.e. LV ties, LV generators and planned outages), clash information and any Permit/Notice information
- Check the correctness of the logic of the switching sheet and that the switching items correctly isolate the nominated LV electrical apparatus

- Confirm that the intent of the switching sheet is satisfied by checking it against EnerGISe/diagrams
- Refer the switching sheet back to the Applicant/Writer for correction if it fails to meet any of these requirements
- Update the status of the application in AMS to ‘Checked’ only after these requirements have been met.

4.4. Switching Sheet Authorising

Unless exceptional circumstances exist, all switching sheets shall be authorised electronically.

The Switching Sheet Authoriser shall:

- Check for any clashes with other LV or HV switching sheets for the nominated date and time
- Check for obvious errors with continuity of supply details (i.e. LV ties, LV generators and planned outages), however, the final responsibility for the correctness of outage information remains with the person conducting the field check
- Notify the Applicant/Writer and Checker by email if any corrections are made; if the switching sheet is unable to be authorised due to inadequate information or if it fails to meet the required standard of accuracy and format, the Authoriser is to return the application status to ‘Field Checked’ in AMS and once corrections have been made, the Checker is to update the status of the application back to ‘Checked’
- Update status in AMS to ‘Authorised’, only after all these requirements have been met.

4.5. Activation

The LV switching sheet shall be activated as close as is practicable to the scheduled switching date, to ensure any changes to the network (abnormality) that occur after authorisation do not affect the switching. When activating switching sheets, the LVOC shall ensure that there are no clashes with other planned or emergency switching sheets (LV or HV).

4.6. Switching Coordination

Coordination of all LV switching (and related outage management processes) is the responsibility of Energex Network Control.

The LVOC shall:

- Give approval to commence LV switching
- Record and monitor Start and Finish times of forward and reverse switching
- Record contact details of LV Switching Operator/s (LVSO/s) carrying out switching
- Issue Permit/Notice and record the details of Responsible Person/Customer/Individuals who are in receipt of them
- Record LV network abnormalities e.g. LV tie closed and left in abnormal state after completion of switching
- Record, monitor and report all Network Outages affecting supply to customers

- Record and monitor HV outages which may affect LV switching e.g. where LV circuits are tied into faulted 11kV areas
- Monitor Customer Calls associated with LV Switching to identify:
  - Network problems e.g. overloading of an adjacent LV circuit causing loss of supply
  - Quality of supply problems
  - Extended outage scope/times
  - Insufficient/incorrect customer interruption notification.
- Maintain communication with Responsible Person/Customer/Individuals who are in receipt of a Permit/Notice when network faults are in proximity to the relevant work area, advising to cease work where appropriate
- Instigate corrective action in the event of network failure as a result of the LV switching
- Report any incidents or near misses for work involving LV
- Report any network or safety related incidents and NECF breaches to the Shift Coordinator.

The LVOC has the authority to:

- Cancel switching sheets in circumstances where:
  - It is found that work greatly exceeds the nominated scope
  - There are significant changes to advertised outage times
  - Isolation affects customers who were not notified (refer to NECF training)
- Make minor changes to authorised switching sheets.

4.6.1. Coordination of Unplanned Switching

For unplanned (emergency) switching the following control measures shall apply:

- The LVOC shall supply the LVSO with an Emergency Switching Sheet Number and approval to commence forward isolation. The LVSO shall identify and carry out isolation on site and then in consultation with the LVOC, using EnerGISe/ diagrams, agree that it is correct.
- Any discrepancies between EnerGISe/diagrams and the LV network configuration in the field are to be investigated further but responsibility for correct isolation in emergency situations rests with the LVSO on site.
- The LVOC shall activate all LV switching sheets and check there are no clashes with other switching sheets (LV or HV).
- A Permit to commence emergency repair work shall not be issued until all associated switching has been completed to isolate and test to prove de-energised the relevant apparatus. Emergency repair work requiring access shall not commence until the appropriate Permit has been received.

- If HV and/or LV switching is required to restore supply to areas electrically adjacent to a LV area isolated with a Permit on issue, all work groups in those adjacent areas shall be contacted and directed to remain clear of electrical apparatus while the switching takes place.
- A work group re-commencing work on isolated apparatus following switching of an adjacent electrical area shall test to prove de-energised, at all worksites, before resuming work on that apparatus.

4.7. Field Switching

Both planned and unplanned (emergency) LV switching is to be performed by an authorised LVSO and a competent Assistant and shall adhere to the principles of 'Teamwork in Switching'.
Both shall ensure:

- For planned switching, they have an authorised switching sheet (checking switching sheet number, time, day and details of work) and the basic intent of the switching sheet is established
- For unplanned switching, they identify the required isolation at site and in consultation with LVOC agree on required switching items
- Any discrepancies between EnerGISe/diagrams and the LV network configuration in the field are to be investigated further but responsibility for correct isolation in emergency situations rests with the LVSO
- Approval is gained from the LVOC to commence both the forward and reverse switching
- Problems encountered during LV switching are reported immediately to the LVOC
- Prior to issuing a Permit/Notice:
  - Testing to prove de-energised is carried out where required
  - All sections are clear and legibly completed
  - Approval is obtained from the LVOC to issue.
- A Permit/Notice is endorsed as having been issued
- The LVOC is informed (where applicable), of the name and contact number of the Responsible Person receiving the Permit or Individual receiving the Notice.

The Responsible Person shall be responsible for receiving Permits, supervising electrical safety at the work area and ensuring all members of the work group are signed on the Permit and are informed of and understand the following (refer *8 Work On or Near De-energised Low Voltage Electrical Apparatus*):

- The electrical apparatus subject to work and the limits of the work area
- Location of isolation points with DNOBs attached
- Any Other Precautions provided
- Location of nearby live HV/LV apparatus at the work area

- Details of any site-specific hazards and associated control measures.

Upon surrendering a Permit, the Responsible Person shall ensure all members of the work group have signed off the Permit and shall notify the LVOC of any abnormalities.

Prior to reverse switching, the LVSO shall ensure all Permits/Notices are surrendered.

All completed field copies of switching sheets and Permits/Notices shall be returned to the LVOO.

4.8. Table 1: Summary of Switching Responsibilities

Type of Switching Sheet	Write	Check	Authorise	Activate	Coordinate
Electronic	**Applicant**	**LVOO**	**LVOC**	**LVOC**	**LVOC**
Unplanned (Emergency)	**LVSO** Identifies required isolation on site and in consultation with LVOC agrees on required switching items		**N/A** *(Emergency Sheets are not authorised)*	**LVOC** *(Clash detection check only, ensuring that nearby network incidents won't compromise the safety of persons carrying out work involving LV)*	**LVOC**

5. Permits, Notices and Do Not Operate Boards

5.1. General Requirements of Low Voltage Work/Fault Finding Permit

The relevant Permit:

- Defines a work area within an electrically isolated area
- Defines the LV electrical apparatus subject to work/test
- Defines the work/test details
- Documents isolation points with safety signs attached
- Documents Other Precautions
- Documents the location at which the LV electrical apparatus has been tested to prove de-energised
- Documents nearby exposed live HV/LV electrical apparatus at the work area
- Designates an Responsible Person as being responsible for the electrical safety of the work
- Can be issued by a LVSO to an Responsible Person or left at the work area
- Shall be surrendered and cancelled and a new Permit issued if there is a requirement to alter any isolation point.

Where a Permit is left at the work area, the Responsible Person shall contact the LVOC and advise they have received the Permit upon arrival at the work area.

5.2. Low Voltage Work Permit (WP)

The *Low Voltage Work Permit - 27058565* shall be issued for all de-energised work on or near LV electrical apparatus not involving lethal current.

If a LV switching sheet provides more than one distinct electrically isolated area then a specific WP is required for each of those isolated areas. Each WP will record only the isolation points applicable to that specific isolated area.

5.3. Low Voltage Fault Finding Permit

Fault finding on LV apparatus may involve the use of equipment capable of producing lethal current. *Low Voltage Fault Finding Permit - 13615542* shall be issued where electrical testing may produce lethal current. Prior to issuing a Low Voltage Fault Finding Permit, any WPs issued for the LV electrical apparatus concerned shall be surrendered.

No more than one Low Voltage Fault Finding Permit can be on issue for the same LV electrical apparatus.

5.4. Customer Isolation Notice

Customer Isolation Notice - 6759316 is issued by a Switching Operator or Energex Representative, to a Customer or a Customer's Electrical Contractor, when Energex has isolated their connected installation from the Energex network to allow:

- A Customers Electrical Contractor to carry out electrical work on the installation e.g. replacement of a main switchboard;
- Any other work by the Customer on their property where it is identified that isolation from the Energex network is required.

Note: A Customer Isolation Notice is not to be issued to Energex employees (refer *Electrical Safety Rules (ESR) - 6503074* for full details of the process).

5.5. Third Party Non-Contact Notice

Third Party Non-Contact Notice - 6741466 is issued by a Switching Operator or Energex Representative to persons to enable them to work near either the HV or LV Energex Network. Third Party Non-Contact Notice does not permit the third party to work on Energex apparatus.

Note: Third Party Non-Contact Notice is not to be issued to Energex employees (refer *Electrical Safety Rules (ESR) - 6503074* for full details of the process).

5.6. Do Not Operate Board (DNOB)

Safety Signs in the form of a DNOB shall be applied to all isolation points required for the isolation of the LV work area. The placement and removal of a DNOB shall be under the direction of a Switching Sheet and documented on the relevant Permit.

Figure 1 – DNOB (Flat)

Figure 2 - DNOB (Hook)

6. Continuity of Low Voltage Supply

6.1. LV Ties

LV ties are to be selected in consultation with the LVOO to ensure all necessary requirements for the security of the distribution network are satisfied.

If LV ties remain closed for a period greater than 48 hours they shall be appropriately fused, following consultation with the LVOO/LVOC.

When LV ties are closed and left in an abnormal state after completion of switching, AMS Network Abnormality System shall be updated by the Outage Coordinator.

When LV ties are used for voltage improvement, a 'Voltage Tie' sign (*Figure 3*) shall be attached to the tie point/s and AMS Network Abnormality System shall be updated.

Figure 3 - Voltage Tie Sign

6.2. LV Ties Selection Preference

When selecting LV ties, the following order of preference shall be used:

1. **Same HV Feeder** (excluding across HV protective devices)

   Any LV tie that when closed will tie together the LV areas of transformers fed from the same HV feeder.

2. **Between Feeders**

   Any LV tie that when closed will tie together the LV areas of transformers fed from different HV feeders supplied from the same Zone Substation.

3. **Across Protective Device/s**

   Any LV tie that when closed will tie together the LV areas of transformers across a HV protective device on the same HV feeder (e.g. Master Drop Out fuses or Automatic Circuit Reclosers).

4. **Between Zones**

   Any LV tie that when closed will tie together the LV areas of transformers fed from HV feeders supplied from different Bulk Supply Substations.

6.3. HV Network Reconfiguration

Any HV network reconfiguration for LV tie purposes should be based on a risk assessment.

The key factors to be taken into consideration include:

- Tie types available
- Anticipated period of time that the LV network will remain abnormal
- Potential impact on security of supply
- Extent of HV network configuration required.

7. Low Voltage Switching Sheets

All switching of LV electrical apparatus including energising new electrical apparatus shall be documented on a switching sheet. The switching sheet shall have:

- A standard format and provide a work location, scheduled dates/times and a detailed description of the work to be carried out
- A unique 'Authorised' reference number generated by AMS
- An alpha suffix added to the 'Authorised' number, when the sheet is hand-written.

7.1. Energising New LV Electrical Apparatus

Where new LV electrical apparatus is being energised, a switching sheet shall be used. The switching sheet shall ensure:

- The electrical apparatus that is to be energised is clearly defined in the work description of the switching sheet
- All non-commissioned points of isolation shall be checked open with a DNOB placed prior to energisation of the non-commissioned apparatus
- Any subsequent electrical apparatus not ready to be energised shall be suitably isolated and checked open with a DNOB placed
- LV apparatus that is associated with non-commissioned HV apparatus (i.e. Padmount, pole or ground transformer) is to remain Not Electrically Connected until the non-commissioned apparatus is under the control of a HV switching sheet.

7.2. Common Isolation Points

Separate DNOBs are to be placed on common isolation points used for the issuing of separate:

- LV Permits e.g. LV link that is common to two WPs;
- HV and LV Permits e.g. LV transformer switch that is common to both a WP and AP.

Switching sheets shall be written to direct the placement/removal of the DNOB that pertains to each switching sheet, for example:

- Check Open, Place ADDITIONAL DNOB
- Remove ONE DNOB only.

8. Work On or Near De-energised Low Voltage Electrical Apparatus

Before commencing de-energised work on or near LV electrical apparatus it shall be isolated, proved de-energised by approved means and be under the control of a Low Voltage Work Permit/Low Voltage Fault Finding Permit.

8.1. Isolation

The LV electrical apparatus subject to work/test shall be isolated from all network sources of supply (including mobile generation).

Permission is required from the Responsible Person when work is to be performed on electrical apparatus that contains an isolation point. Work shall not be of a nature that will compromise the integrity of that isolation point.

8.2. Test to Prove De-energised

Before commencing each session of work, including after breaks, all isolated electrical apparatus within the work area shall be treated as energised until it has been tested to prove de-energised, using an approved device.

8.3. Other Precautions

Other Precautions are placed in addition to isolation and testing to prove de-energised, and may be provided at the work area to contribute to the electrical safety of the work group.

The placing of Other Precautions:

- Shall be an item on the LV switching sheet
- Shall be recorded by the Switching Operator in the relevant section of the Permit
- Shall be recorded by the Responsible Person in the relevant section of the Permit where Other Precautions are altered or additional Other Precautions are placed at the work area to suit the progress of work.

8.4. Sign On

All members of the work group shall sign on the LV Permit and in doing so acknowledge that they:

- Understand the purpose and limits of the Permit, including the location of isolation points and nearby exposed HV/LV
- Understand Other Precautions
- Have been made aware of all hazards and associated control measures
- Will test to prove de-energised at any worksite within the work area
- Will follow any safety directions given by the Responsible Person
- Will notify the Responsible Person prior to leaving the work area and immediately upon returning to the work area.

8.5. Insulating Gloves

Although isolated from network sources of supply, the work area can become energised by alternative sources such as customer generation at any time.

To protect workers from alternative generation sources and stored energy, workers shall wear Class 00 gloves in accordance with approved procedures when working on or near exposed LV electrical apparatus.

8.6. Integrity of Common Isolation Points

Work performed on LV electrical apparatus that is an isolation point shall not be of a nature that will compromise the integrity of that isolation point. An exception to this is where the isolation point is common to related HV and LV switching sheets.

When it is intended to work on an isolation point common to both an AP and WP:

- The HV and LV applications are to note that the common isolation point is to be worked on/removed/replaced
- Both HV and LV switching sheets are to note that the common isolation point is to be worked on/removed/replaced and reference each other.

The common isolation point maintains its integrity as an isolation point when worked on/removed/replaced only when the following conditions are met:

- The work shall be performed by a single work group under the supervision of the Recipient of the AP
- The Recipient of the AP is also the Responsible Person of the WP.

When the conditions above have been met, the Recipient shall:

- Direct the removal of the DNOBs from the common isolation point for work/removal/replacement
- Confirm that the common isolation point is returned to its correct state and integrity at the completion of work/removal/replacement and then direct the attachment of the previously removed DNOBs.

The Switching Operator shall ensure:

- The installation and status of the restored common isolation point is correct and that the isolation point provides effective isolation
- On reversal of both the HV or LV switching sheet the common isolation point is checked open, with 2 DNOBs placed;
- If only 1 DNOB is found, confirm with the Switching Coordinator that the associated switching sheet has removed the additional DNOB.

8.7. Transfer of Low Voltage Work Permit or Fault Finding Permit

If a Permit is required to be transferred to another Responsible Person:

- The LVOC shall be advised of the name of the incoming Responsible Person at the time of transfer
- The incoming Responsible Person shall be briefed in person of the isolation points, Other Precautions and any nearby exposed HV/LV
- The incoming Responsible Person shall ensure that all members of the work group signed on the Permit are made aware of the transfer.

A transfer shall only occur once. If there is a requirement to transfer a second time, the Permit shall be surrendered and cancelled and a new Permit issued.

8.8. Surrender of Low Voltage Work Permit or Fault Finding Permit

Before a Permit is surrendered, the Responsible Person shall ensure that:

- All members of the work group have signed off the Permit and they have been informed to treat the electrical apparatus covered by the Permit as live
- If members of the work group are not present:
  - Record their absence in the Abnormalities section of the Permit, and
  - Advise absent individuals as soon as practicable that the Permit has been surrendered.
- Any required pre-energisation checks/tests have been completed.
- Any abnormalities are listed on the WP/Fault Finding Permit (e.g. unserviceable electrical apparatus, absent individuals, any pre-energisation checks/tests that failed or were not completed).

When the Responsible Person is satisfied the above conditions are met, they may surrender the Permit and advise the LVOC that the Permit has been surrendered.

8.9. LV Network Abnormalities

In cases where the LV network is left in an abnormal state following work (e.g. placement of voltage ties, cable isolated due to damage/fault, apparatus operating restrictions or changes to the normal LV network configuration), the Responsible Person performing the work shall advise the LVOC of the following:

- Details of the abnormality e.g. ties closed for voltage improvement, restricted CFS pillar
- Anticipated time frame before the system will be returned to normal.

The LVOC who is advised of any abnormalities shall ensure the:

- Details of these abnormalities are entered into the AMS Network Abnormality System
- HV Switching Coordinator is advised of any LV network abnormalities which may have an effect on the operation of the HV network (e.g. LV ties across feeders, distribution transformers tied together)
- Escalation of the abnormality in situations where it is deemed that the abnormality poses an unnecessary risk to the network (e.g. LV ties across zones) is managed.

9. Work Involving Low Voltage and High Voltage

9.1. HV Switching Required for Low Voltage Work

If HV isolation is required for LV work, then a HV switching sheet may be used to issue the Permit required to perform the work. The highest voltage of exposed electrical apparatus that is likely to be encroached upon determines the Permit type i.e.:

- AP required for work on or near exposed HV electrical apparatus
- WP required for work on or near exposed LV electrical apparatus.

For work performed at a distribution transformer site, LV isolation at the transformer shall always be performed to mitigate against alternative sources back energising the HV system.

9.2. Combinations of High Voltage and Low Voltage Switching

Any reconfiguration of the LV network via ties and/or bridges will require a separate LV switching sheet.

The closing and opening of LV ties as part of a HV switching sheet for the purpose of tying in a transformer, checking open LV tie points or checks/tests on the LV network resulting from HV work does not constitute reconfiguration of the LV network.

9.3. Table 2: HV and LV Switching Scenarios

The following table is used to illustrate the combined HV and LV switching principles.

Scenario	Example(s)	**LV Switching Sheet** (WP for LV works)	**HV Switching Sheet** (AP for HV works)	**HV and LV Combined Switching Sheet** (all work performed under an AP)
Work performed requires specific LV tests at other locations on the LV network as a result of the LV work	Replace HV Pole with LV cross-check	Yes	Yes	No
Work performed at a site requiring the interruption of an entire Transformer LV area	Replace Pole Transformer	Yes	Yes	No
	Replace combined HV/LV pole - non transformer pole	Optional	Yes	Yes*
Work performed at a site requiring the partial interruption of a Transformer LV area	Replace combined HV/LV pole - non transformer pole	Yes	Yes	No
Different HV and LV sites	Replace Pole Transformer and install LV protection on the adjacent poles	Yes	Yes	No
	Replace HV Pole and re-conductor an LV area that has no LV Ties	Optional	Yes	Yes*
Work performed at a site with the LV area supplied by another transformer outside the HV isolation.	Replace HV/LV Pole	Yes	Yes	No

*Due to combined work being performed under an AP, the Recipient shall be capable of fulfilling their responsibilities as per SAHV procedures i.e. supervise electrical safety at all work areas.

A HV application nominating apparatus on the LV network as isolation points is not to be submitted unless the status of the LV network has been confirmed on site. An application will not be processed unless the isolation points nominated on that application have been confirmed as field checked.

The LV switch/fuse shall always be isolated and DNOB placed when performing work at a distribution transformer site.

Note: Table 2: HV and LV Switching Scenarios

and the illustrated examples do not cover every situation that may arise. The HV Outage Coordinator can determine if the LV switching can be incorporated into a HV switching sheet. i.e. separate HV and LV switching sheets or a HV switching sheet.

9.4 LV Isolation at Distribution Transformer for HV and LV Work

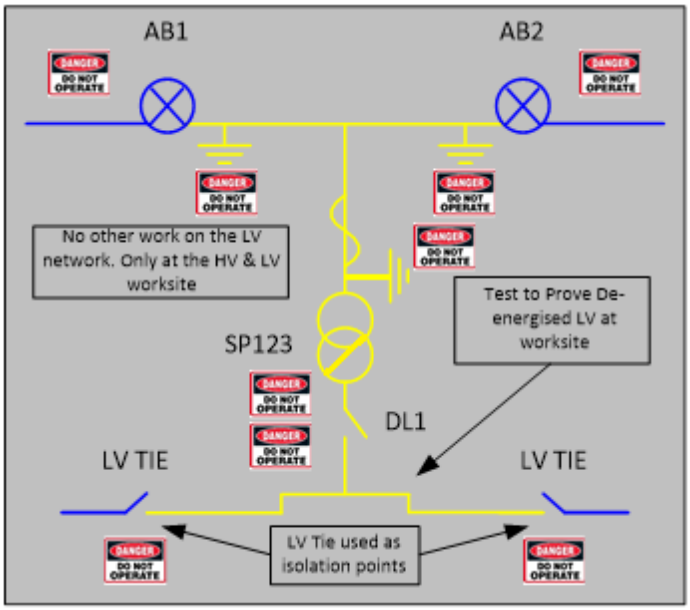
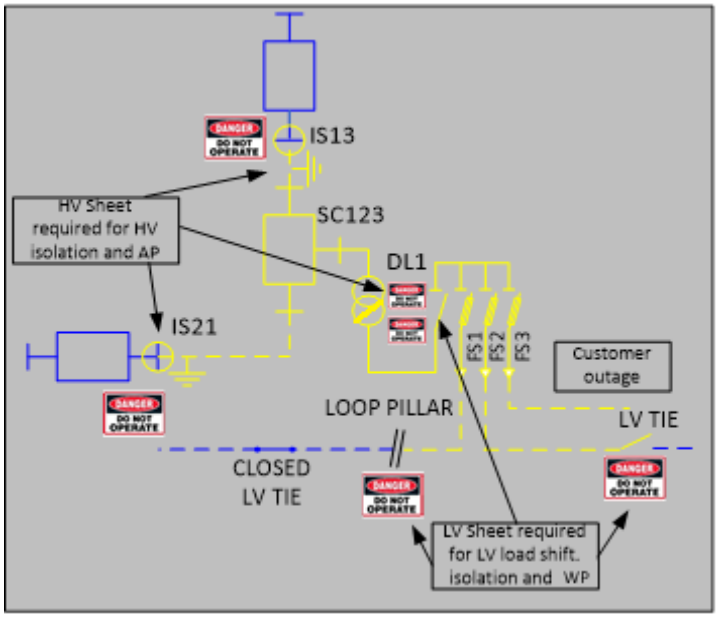


Figure 4 - LV Isolation at Transformer for HV and LV Work

Replace Pole Transformer SP123 and supply interruption to the entire Transformer SP123 LV area.
An AP is required for the HV work and a WP is required for the LV work.
The LV Switch DL1 is a common isolation point.

9.5 Separate HV and LV switching sheets - UG



Replace Padmount Transformer SC123 with a partial interruption to the SC123 LV area.
An AP is required for the HV apparatus at SC123 with DNOBs placed on SC123 transformer LV switch and other relevant HV isolation points.
A WP is required for the LV apparatus at SC123 with DNOBs placed on SC123 transformer LV switch and other relevant LV isolation points.

Figure 5 – Separate HV and LV switching sheets UG

9.6 Separate HV and LV Switching Sheets OH

Replacing HV/LV P123 with the LV area supplied by another transformer outside the required HV isolation.

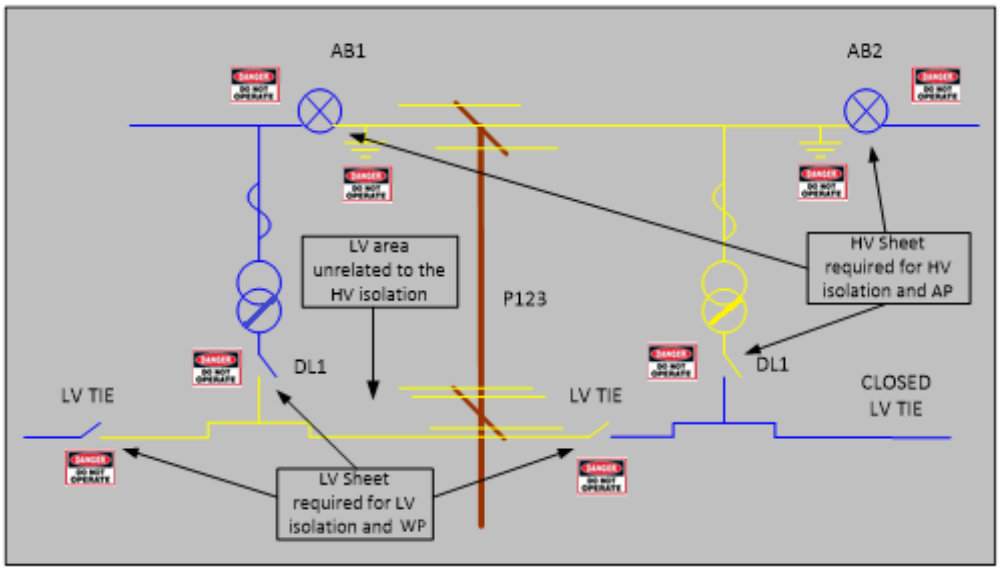


Figure 6 - Separate HV and LV Switching Sheets – OH

9.7 Interfacing HV and LV Switching Sheets

When there is a requirement for separate HV and LV switching sheets, they shall be carried out in a critical sequence with regards to each other. It must be ensured that:

- Both HV and LV applications are cross-referenced to each other in the remarks of the associated applications
- Both HV and LV applications nominate which sheet is to commence first in the forward and reverse switching
- Both HV and LV switching sheets cross-reference the associated switching sheet at the start of the forward and reverse switching operations
- Switching sheets, where required, cross-reference other associated switching sheets at critical stages.

9.8 DNOBs Remaining on Low Voltage Transformer Switches Following HV Work

The HV switching sheet shall direct the Switching Operator to leave the transformer LV switch Open with a DNOB placed, in situations where a distribution transformer has been constructed and energised up to the transformer LV switch and:

- Further LV work must be completed before the transformer LV switch can be safely closed or;

- There is no LV switching sheet controlling the transformer LV switch (the switching is controlled by a single DNOB placed by the HV sheet).

An example of a suitable item on the HV switching sheet reversal may be:

SP777479<PSP777479> GITTINS RD WITHCOTT	LV Switch / Fuse TR1	LV Sheet to Remove DNOB, Close

Figure 7 - Reverse HV Switching Item for Pole Transformer

Once the LV switch has been left Open with a DNOB Placed, ensure that:

- Before work commences on the LV area, the LV switch is checked Open and that a DNOB has been placed
- When the LV work is completed and the apparatus is ready to be energised, an LV switching sheet can direct the DNOB to be removed and the switch closed.