Your Company Ltd

SAFE SYSTEM OF WORK

Electrical Isolation and Switchgear Maintenance

Reference	EX0014
Issue	1
Assessment Date	14/11/2026
Review Date	14/11/2027
Client	Your Client Ltd
Site Location	Commercial building substation
Assessor	Your Name, Health & Safety Manager

Executive Summary

This Safe System of Work (SSOW) outlines the mandatory procedures for the safe isolation, testing, and maintenance of 11kV switchgear located within a commercial building substation. The operations include high-voltage (HV) electrical isolation, application of primary earths, oil sampling, contact inspection, and protection relay testing. Work will be strictly controlled under a High Voltage Permit to Work and Sanction for Test, executed exclusively by two Senior Authorised Persons (SAPs) due to the critical risks of arc flash and presence of adjacent live panels.

Contents

1. Task Overview
2. Safe Work Procedures
3. Competency & Training
4. Equipment & Inspection
5. PPE Requirements
6. Site Rules
7. Emergency Procedures
8. Monitoring & Review
9. ALARP Justification
10. Regulatory Compliance
11. Incident & Near-Miss Reporting
12. Applicable Legislation
13. Staff Acknowledgment
14. Assessor Declaration & Client Acceptance

1. Task Overview

Client	Your Client Ltd	**Site Location**	Commercial building substation
Description	Isolation, testing, and maintenance of 11kV switchgear, incorporating safe isolation, proving dead, earthing, oil sampling, contact inspection, and protection relay secondary testing. Operations involve live adjacent panels and require precise sequential switching.		
Duration	1 Shift (8 to 10 hours)	**Personnel**	2
Permits	High Voltage Permit to Work, Sanction for Test, Substation Access Permit		

2. Safe Work Procedures

Step 1. Substation entry and pre-work assessment

Senior Authorised Person (Lead)

Hazards	• Unauthorised access • Environmental hazards within substation (poor lighting, trip hazards) • Misidentification of equipment
Controls	• Ensure SAP controls substation keys and doors are locked from the inside to prevent unauthorised entry • Conduct a visual inspection of the substation for leaks, trip hazards, and adequate lighting • Review single-line diagrams (SLD) and physically verify switchgear labels and operational states • Both SAPs to cross-check equipment identification against the switching programme

Step 2. Establishment of safe working zone and demarcation

Senior Authorised Person (Lead)

Hazards	• Inadvertent contact with adjacent live 11kV panels • Confusion regarding safe work areas
Controls	• Apply high-visibility hazard tape or physical barriers to delineate the panel to be worked on • Affix 'DANGER LIVE' notices to all adjacent live panels and 'SAFE WORKING AREA' notices to the isolated panel • Conduct a toolbox talk to confirm both SAPs understand the exact limits of the safe zone

Step 3. Switching and isolation of the 11kV circuit

Senior Authorised Person (Lead)

Hazards	• Arc flash during switching operations • Failure of mechanical linkages • Back-feed from downstream networks
Controls	• Don full Arc Flash switching suit, dielectric gloves, and face shield prior to any operation • Open the circuit breaker, followed by the isolator, adhering strictly to the approved switching schedule • Stand to the side of the switchgear during operation (using the 'one-hand rule' to deflect blast energy) • Apply unique safety padlocks to the isolator operating handles to prevent re-energisation • Display 'CAUTION DO NOT OPERATE' tags at all points of isolation

Step 4. Proving dead and application of primary earths

Senior Authorised Person (Lead)

Hazards	• Retained electrical charge • Faulty voltage indicator giving false negative • Flashover
Controls	• Test High Voltage Indicator (HVI) on an approved proving unit to ensure functionality • Insert HVI into the test spouts to prove the circuit is dead on all three phases • Retest HVI on the proving unit immediately after use to confirm it is still functioning • Close the earth switch or apply portable earthing leads to the circuit and lock in the EARTH position • The second SAP must visually confirm the correct application of all locks and earths

Step 5. Issue of High Voltage Permit to Work and Sanction for Test

Both Senior Authorised Persons

Hazards	• Procedural failure • Misunderstanding of safety document conditions
Controls	• Lead SAP formally issues the Permit to Work and Sanction for Test • Second SAP receives and countersigns the documents, confirming understanding of the safety arrangements • Place the key safe (containing isolation keys) in a visible location and secure it

Step 6. Oil sampling from switchgear tank (if oil-filled)

Senior Authorised Person (Testing)

Hazards	• Exposure to insulating oil (dermatitis, carcinogenic risks) • Oil spillage creating slip hazards and environmental contamination
Controls	• Review COSHH assessment for the specific insulating oil • Wear nitrile gloves and eye protection during sampling • Position an oil spill tray under the sampling valve • Have a chemical spill kit immediately available in the substation • Seal sample bottles securely and clean any minor drips immediately

Step 7. Contact inspection and mechanical maintenance

Senior Authorised Person (Testing)

Hazards	• Trapping of fingers in mechanism • Dropped tools into switchgear housing • Dust and debris inhalation
Controls	• Isolate control springs (discharge mechanism) before accessing internal contacts • Use only approved, insulated hand tools (BS EN 60900) • Implement a strict tool inventory (count in/count out) to ensure no tools are left inside • Wear mechanics gloves to prevent pinch injuries during manual operation of the mechanism

Step 8. Protection relay secondary testing

Senior Authorised Person (Testing)

Hazards	• Unintended tripping of adjacent live circuits via intertripping • Electric shock from secondary injection test set (230V/110V supply)
Controls	• Identify and physically remove/isolate intertrip links to adjacent live panels before testing • Ensure the secondary injection test set has a valid PAT/calibration certificate and is powered via a 110V transformer or RCD-protected supply • Perform testing according to manufacturer guidelines • Second SAP to monitor adjacent panels to ensure no unintended operations occur

Step 9. Restoration of switchgear and cancellation of safety documents

Both Senior Authorised Persons

Hazards	• Tools left inside equipment causing short circuit • Premature re-energisation
Controls	• Conduct a final visual inspection and reconcile tool inventory (count out) • Securely bolt and refit all covers and access panels • Remove test connections and primary earths sequentially as per the switching schedule • Cancel the Sanction for Test and Permit to Work formally, returning documents to the control file

Step 10. Re-energisation and return to service

Senior Authorised Person (Lead)

Hazards	• Catastrophic failure upon re-energisation • Arc flash
Controls	• Ensure all non-essential personnel (if any) are outside the substation • Don full Arc Flash PPE before operating the switchgear • Close the isolator, then close the circuit breaker, standing to the side • Verify correct voltage and phasing via metering, then lock the substation doors upon exit

3. Competency & Training

1. Senior Authorised Person (SAP) - 11kV/33kV

Description	Formal company or DNO authorisation to switch, isolate, and issue safety documents on HV systems.		
Required For	Both operatives executing the work	**Verification**	Check HV Authorisation Certificate and internal register prior to work commencement

2. First Aid at Work (FAW) with Defibrillator Training

Description	Comprehensive first aid training including CPR and response to electrical shock/burns.		
Required For	At least one SAP present	**Verification**	Certificate check during site induction

3. Electrical Protection Testing Training

Description	Specific competence in the use of secondary injection test sets and relay configuration.		
Required For	The SAP conducting the relay testing	**Verification**	Review of training records/CPD

4. Equipment & Inspection

1. High Voltage Indicator (HVI) and Proving Unit

EAWR 1989 Regulation 4(4), PUWER 1998 Regulation 6

Inspection Regime	Annual calibration. Visual inspection and functional test before and after every use.
Pre-Use Checks	• Check calibration expiry date • Inspect fiberglass rod and indicator casing for cracks or damage • Test on proving unit to ensure clear visual/audible indication

2. Secondary Injection Test Set

PUWER 1998 Regulation 6, EAWR 1989

Inspection Regime	Annual calibration and Portable Appliance Testing (PAT).
Pre-Use Checks	• Check calibration and PAT expiry dates • Inspect power leads and test probes for insulation damage • Verify emergency stop button (if fitted) is functional

3. Insulated Hand Tools (BS EN 60900)

PUWER 1998 Regulation 6

Inspection Regime	Routine visual inspection before every use. Replacement if insulation is compromised.
Pre-Use Checks	• Inspect tool insulation for cuts, abrasions, or exposed metal • Ensure tools are clean and free from oil or grease before use

4. Portable Earthing Leads

EAWR 1989 Regulation 4(2)

Inspection Regime	Thorough examination and micro-ohm testing annually. Visual check pre-use.
Pre-Use Checks	• Check transparent insulation for signs of broken strands • Ensure clamps are mechanically sound and free from excessive oxidation • Verify CE/UKCA marking and current test tag

5. PPE Requirements


Head protection


Face shield


Gloves


Safety footwear

- Arc Flash Switching Suit (IEC 61482-2, minimum 40 cal/cm² ATPV rating or as dictated by arc flash study)
- Dielectric Gloves (BS EN 60903 Class 2) with leather over-protectors
- Arc Flash Face Shield and Safety Helmet (EN 166, EN 397, GS38 compliant)
- Dielectric Safety Boots (EN ISO 20345 S3, entirely non-metallic)
- Nitrile Gloves (EN 374, for oil sampling only)

6. Site Rules

1. Sign in at the site office and complete the site induction before accessing the substation
2. No entry to the substation without a valid Access Permit and SAP supervision
3. Absolute adherence to the HV Safety Rules; assume all equipment is LIVE unless proven dead and earthed
4. No mobile phones, radios, or distractions are permitted during switching operations
5. A formal tool count must be conducted before covers are closed
6. No food or drink is to be consumed within the substation environment

7. Emergency Procedures

First Aid
First aid kit and automated external defibrillator (AED) located in the main site office. In the event of electric shock, isolate power before touching the casualty. Administer CPR if required.

Fire Emergency
CO2 fire extinguishers positioned outside the substation doors. DO NOT USE WATER OR FOAM. If fire is uncontrollable, evacuate and call 999.

Rescue Procedures
Insulated rescue hook (crook) stationed at the substation entrance. Use only if casualty is still in contact with live apparatus.

Evacuation
Leave the substation immediately, locking the door behind if safe to do so. Proceed to the main assembly point at the front car park.

Spillage Response
Oil spill kit available inside the substation. Contain spills immediately using absorbent mats to prevent ingress into cable trenches.

Emergency Contacts
Site Manager: [Number]. SAP Lead: [Number]. Emergency Services: 999. Local DNO Emergency Line: 105. HSE Incident Contact Centre: 0345 300 9923.

8. Monitoring & Review

Supervision	Continuous peer-to-peer supervision by two Senior Authorised Persons throughout all operations.
Review Schedule	Review this SSOW prior to commencing the shift, and subsequently following any network alterations or incidents.
Responsible Person	Authorising Engineer / SAP Lead
Review Triggers	Any discrepancy found between the physical switchgear and the Single Line Diagram; Equipment failure or unexpected protection operation during testing; Following any accident, incident, or near-miss; Change in personnel executing the task

9. ALARP Justification

As Low As Reasonably Practicable (ALARP) Declaration

The residual risks in this safe system of work have been reduced to ALARP through strict sequential procedural controls mandated by the HV Safety Rules. The hazards of high voltage electrocution and arc flash are controlled by ensuring absolute isolation, locking off, proving dead, and the application of primary earths prior to issuing a Permit to Work. The requirement for two highly trained Senior Authorised Persons ensures procedural cross-checking. Furthermore, mandatory use of Arc Flash PPE and insulated tools provides a robust secondary defense. Further risk reduction (such as entirely de-energising the adjacent network) would cause disproportionate disruption to the commercial building's infrastructure compared to the mitigated risk level.

10. Regulatory Compliance

Regulation / Standard	Section	Relevance to This Assessment
Health and Safety at Work etc Act 1974	Section 2(2)(a) — Safe systems of work	Legal duty to provide and maintain safe systems of work for all employees undertaking high-risk maintenance.
Electricity at Work Regulations 1989	Regulation 12 — Means for cutting off the supply and for isolation	Dictates the requirement to safely isolate the switchgear from all sources of electrical energy.
Electricity at Work Regulations 1989	Regulation 13 — Precautions for work on equipment made dead	Mandates the proving dead and application of earths before work commences.
Electricity at Work Regulations 1989	Regulation 14 — Work on or near live conductors	Governs the controls required regarding the adjacent 11kV live panels, ensuring adequate demarcation and competence.
Provision and Use of Work Equipment Regulations 1998	Regulation 6 — Inspection	Requires all testing equipment, tools, and earths to be inspected and maintained in a safe condition.
Control of Substances Hazardous to Health Regulations 2002	Regulation 7 — Prevention or control of exposure	Applies to the handling of insulating oil during the sampling process.

11. Incident & Near-Miss Reporting

Minor Injury
Administer first aid on site. Record the event in the site Accident Book (BI 510). Notify the Site Manager and Authorising Engineer immediately. Complete an internal incident report within 24 hours.

Serious Incident
STOP WORK IMMEDIATELY. Do not approach the casualty if electrocution is suspected until the power is isolated. Call 999. Preserve the scene. Notify the Site Manager and H&S Lead immediately.

Near-Miss Reporting
Report all near-misses (e.g., dropped tools near live busbars, incorrect labeling) to the SAP Lead immediately. Halt work if necessary. Investigate root cause within 48 hours and update this SSOW if required.

RIDDOR Reporting
Report to the HSE under RIDDOR 2013 for electrical short circuits/overloads causing fire or explosion (Dangerous Occurrence), fatalities, specified injuries, or over-7-day incapacitation. Report at www.hse.gov.uk/riddor or by calling 0345 300 9923.

Emergency Contacts
SAP Lead: [Number], H&S Lead: [Number], Emergency Services: 999, HSE: 0345 300 9923

12. Applicable Legislation

- Health and Safety at Work etc Act 1974
- Management of Health and Safety at Work Regulations 1999
- Electricity at Work Regulations 1989
- Provision and Use of Work Equipment Regulations 1998 (PUWER)
- Personal Protective Equipment at Work Regulations 1992 (as amended 2022)
- Control of Substances Hazardous to Health Regulations 2002 (COSHH)

13. Staff Acknowledgement

I confirm that I have read and understood the above Safe System of Work and will comply with the procedures set out.

Name	Position	Date	Signature
No staff acknowledgments recorded yet.			

Assessor Declaration & Client Acceptance

I confirm that this assessment has been prepared by a competent person and represents a suitable and sufficient assessment of the risks associated with the described work activity, in accordance with the Management of Health and Safety at Work Regulations 1999.

Prepared By (Assessor)	**Accepted By (Client / Principal Contractor)**
Your Name, Health & Safety Manager	
Name & Position	Name & Position
Signature	Signature
Date	Date