SAFE OPERATION PROCEDURE (SOP)

Power System Laboratory, Department of EEE, BUET

1. Purpose

This SOP outlines safe operating practices for undergraduate experiments conducted in the Power System Laboratory involving low-voltage power system models, power factor improvement equipment, and computer-based simulation studies. The aim is to ensure safety of personnel and protection of laboratory equipment.

2. Scope

This SOP applies to all students, instructors, and lab staff performing experiments using **LT supply only**: - Rated supply: **415 V (line-to-line), 230 V (line-to-neutral)** - Transmission line studies using **De Lorenzo power system models** - Power Factor Improvement (PFI) plant experiments - Software-based power system studies using computers and simulation tools

3. Authorization & Supervision

- Experiments shall be conducted **only under supervision** of the course teacher or lab engineer.
- Students must perform **only the experiments assigned** in the laboratory manual.
- Unauthorized alteration of wiring, PFI configurations, or system parameters is strictly prohibited.

4. General Safety Rules

- Treat all circuits as live unless isolated and verified.
- Wear closed footwear and avoid loose clothing or metallic accessories.
- Ensure hands are dry; liquids are not allowed near electrical panels or computers.
- Do not touch exposed terminals, busbars, or capacitor terminals.
- Maintain a tidy workspace to avoid accidental contact.

5. Pre-Operation Checklist

Before energizing any setup: - Verify all circuit connections with the instructor/lab staff. - Ensure all switches, MCBs, and isolators are **OFF** during wiring. - Confirm correct rating and connection of transmission line modules and loads. - Ensure capacitor banks in the PFI plant are **fully discharged** before configuration. - Select appropriate ranges of ammeters, voltmeters, and power factor meters. - Check proper earthing of all panels and metallic enclosures.

6. Operating Procedure (Transmission Line & PFI Experiments)

- Energize the supply only after receiving clearance from the supervisor.
- Increase load and switch capacitor banks **step-by-step**, as per experiment procedure.
- Observe voltage, current, power, and power factor continuously.
- Do not exceed rated voltage, current, or capacitor bank limits.
- Never switch capacitor steps rapidly or under abnormal conditions.

7. Operating Procedure (Computer & Software Experiments)

- Ensure computers and peripherals are properly powered and earthed.
- Do not modify software settings beyond the scope of the experiment.
- Handle cables, power cords, and USB devices carefully.
- Shut down software and systems properly after completion of the experiment.

8. Abnormal Conditions & Response

- In case of abnormal heating, noise, smell, or voltage fluctuation: **switch OFF supply immediately**.
- Inform the instructor/lab engineer before re-energizing.
- Do not attempt troubleshooting without permission.

9. Post-Operation Procedure

- Reduce load to zero and switch OFF the supply.
- Open all switches and isolators.
- Allow time for capacitor discharge before touching terminals.
- Restore setups to original condition if instructed.
- Keep benches, panels, and computer stations clean and organized.

10. Emergency Procedures

- In case of electric shock: disconnect supply immediately and seek help.
- For electrical fire: use **CO_2 or dry powder extinguisher only**.
- Report all incidents to laboratory authorities.

11. Compliance

Failure to comply with this SOP may result in **termination of the experiment** and disciplinary action as per BUET regulations.

Note: Although the laboratory operates at low voltage, unsafe handling of capacitors, transmission line models, and electrical panels can cause serious injury or equipment damage. Strict adherence to this SOP is mandatory.