

LOW VOLTAGE ALTERNATING CURRENT (LVAC) AUXILIARY SUPPLIES FOR TRANSMISSION SUBSTATIONS.

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PURPOSE AND SCOPE

The normal operational security of a transmission substation is dependent on the availability of its auxiliary LVAC supplies to drive site assets such as transformer tap changers and cooling, air compressors, switchgear drive motor circuits and site battery chargers.

The ideal is to provide LVAC diversity to site, that is to have site supplies which are independent and of high security. In achieving this, normal site operations will be maintained in the event of the loss of the permanent LVAC supply under fault conditions.

It is recognised by National Grid that following a major system disturbance, when large parts of the transmission system may become islanded, substation auxiliary supplies reliability and availability plays a major role in the recovery of the system back to normality.

Substation LVAC supplies are derived from combinations of the following feeder arrangements:

- On-site aux/ earthing transformers - permanent supply.
- An adjacent Generating Substation - permanent supply.
- A local Distribution Network Operator (DNO) - permanent supply.
- By on-site diesel generating set(s) - standby supply.

This policy details the LVAC connection strategy at both new substations and legacy substations where retrospective enhancement or refurbishment work on the auxiliary supplies is planned.

PART 1 – POLICY

1 SUBSTATION LVAC INCOMING SUPPLY ARRANGEMENTS.

1.1 LVAC Equipment General Requirements

- 1.1.1 The procurement of equipment associated with a transmission substation LVAC system shall comply with the requirements detailed within National Grid Technical Specification TS 3.12.3 – Substation LVAC Supplies.

1.2 Configuration of LVAC Supplies at New Build Substations

- 1.2.1 Unless specified otherwise by National Grid, a new substation LVAC installation shall be provided with the following minimum requirements:
- a) One fully rated permanent LVAC incoming supply.
 - b) One fully rated standby LVAC diesel generator derived supply.

- c) A facility to position and readily connect one fully rated mobile diesel generator.

Exceptions to the standard connection (i.e. Critical Sites as defined in TGNE 226) shall be supported by a satisfactory WLV (Whole Life Value) Assessment.

For environmental reasons, care shall be taken to ensure that diesel derived LVAC supplies are not relied upon for extended running periods. An example of this is when site auxiliary / earthing transformer derived LVAC supplies are de-energised because of planned maintenance activity on the donor circuit grid transformer.

The diesel generator shall be rated to supply all site loads required to secure the HV operational capability of the site. A rating survey (preferably monitoring actual loads) shall be used to provide an accurate representation of loading requirements and their classification of the LVAC supply. The survey shall take into consideration continuous load and peak loads during starting which the diesel generator will be required to support. The staggering of loads, using time delay or alternate methods is encouraged to reduce demand requirements. Consideration shall be given to the provision of an additional standby diesel generator when site loading requirements are approaching the maximum commercially available diesel generator set.

1.3 Configuration of LVAC Supplies at Legacy Substations Subject to Planned Enhancement or Refurbishment Work on its Auxiliary Supplies

- 1.3.1 Consideration should be given to achieving the connection profile detailed in section 1.2 where a satisfactory WLV (Whole Life Value) Assessment to decommission duplication to achieve this can be proven. This may in some instances mean that legacy sites are reconfigured to reduce the number of DNO or Auxiliary / Earthing transformer derived LVAC supplies, where there is a concern with the reliability of supply, or diversity of multiple supply sources.

The design of LVAC distribution switchboard configuration shall ensure that safe access and egress for maintenance and repair of the distribution switchboard and associated switchgear is achievable with minimum disruption to the site operational capability.

Informative: The Supplier will need to demonstrate how their solution will allow for maintenance or repair activities to be carried out safely without the requirement for prolonged switchboard busbar outages.

2 FORMS AND RECORDS

Not applicable.

PART 2 - DOCUMENT HISTORY

3 DEFINITIONS

Not applicable.