



POWER CONTROL ENGINEERS

HIGH VOLTAGE ELECTRICAL SUPPLY CONNECTIONS

Overview of High Voltage Customer Obligations

HIGH VOLTAGE (HV) CUSTOMERS CONNECTED TO THE SUPPLY AUTHORITY'S NETWORK HAVE CERTAIN OBLIGATIONS TO ENSURE THE INSTALLATION IS OPERATED IN A SAFE MANNER. TO THIS END, THE NSW SERVICE AND INSTALLATION RULES UNDER THE ELECTRICITY SUPPLY ACT (1995) AND AUSGRID REQUIRE THE CONTROLLER (I.E. THE OWNER OR A LESSEE) OF ANY PREMISES HAVING A HV INSTALLATION TO PRODUCE AND MAINTAIN AN INSTALLATION SAFETY MANAGEMENT PLAN.

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1 INTRODUCTION

High Voltage (HV) customers connected to the supply authority's network have certain obligations to ensure the installation is operated in a safe manner. To this end, the NSW Service and Installation Rules under the Electricity Supply Act (1995) and Ausgrid require the controller (i.e. the owner or a lessee) of any premises having a HV installation to produce and maintain an Installation Safety Management Plan.

2 INSTALLATION SAFETY MANAGEMENT PLAN

The contents of an Installation Safety Management Plan (ISMP) should address the full range of risks likely to be associated with the operation, maintenance and possible deterioration of electrical equipment as it ages. The plan should be based on appropriate risk analysis techniques and cover matters such as non-compliant equipment, upgrade and refurbishment programs, site hazards, etc.

The plan should address all aspects of the installation, including:

- System design;
- Operation;
- Maintenance;
- Site specific operating rules and associated schedules;
- Corrective action procedures;
- Management and reporting

The topics that should be considered for inclusion are further detailed in Appendix A.

2.1 HIGH VOLTAGE INSTALLATION RESPONSIBLE PERSON

The High Voltage Installation (HVI) responsible person is a person charged with the responsibility to ensure all aspects of the ISMP are executed in a timely manner. Whilst this role is generally filled by an individual employed by the owner of the HV installation, it can also be delegated to a third party.

The duties required to perform this role are outlined in Appendix B.

2.2 OPERATING PROTOCOL

An operating protocol is an agreement between the controller of the HV installation and the supply authority (Ausgrid). It forms a part of the ISMP.

This document defines the respective responsibilities of the controller of a private HV installation and Ausgrid for the operating (switching) of parts of the customers installation and the electricity distribution network at the interface of the installation and the network. It also records the contact details for communication between Ausgrid's System Control personnel and the customer's high voltage operating personnel.

The HVI responsible person will execute the operating protocol when isolation from the electricity distribution network is required.

3 REFERENCES

The references for this report are taken from the following standards:

	STANDARD NUMBER	DESCRIPTION
1	AS 2467	Maintenance of Electrical Switchgear
2	Ausgrid Publication ES1	Customer Connection Information
3	Ausgrid Publication NS195	High Voltage Customer Connections
4	ENA NENS 03-2006	National Guidelines for Safe Access to Electrical and Mechanical Apparatus
5	DWE 07-207	Code of Practice (Electricity) – Service and Installation Rules of New South Wales – (2007)

4 APPENDICIES

Appendix A - Topics for Inclusion in an ISMP (Extract from ES1 – Customer Connection Information)

The following are some, but not necessarily all, of the topics that should be considered for inclusion in a plan:

- A single line diagram (schematic) for the high voltage installation showing all switches and circuit breakers and their identifying labels or numbers.
- A set of site specific operating rules covering all aspects of operating the high voltage installation. This should contain specific operating instructions for each piece of high voltage equipment. It should also contain a procedure for arranging isolation of the installation from the Ausgrid high voltage network. Ausgrid's Customer Operations officer, coordinating the arrangements for connection of a new installation, will on request, provide details of the Operating Agreement procedure that applies to arranging isolation of a HV installation from the network.
- The qualifications and training of people who will be allowed to operate and/or work on the high voltage installation. This should also address retraining/retesting/reaccreditation procedures.
- Procedures for ensuring that areas containing high voltage equipment are accessible only by persons suitably qualified to enter such areas.
- Induction procedures for acquainting non-employees (contractors, visitors, etc) with the requirements of the plan when relevant.
- Inspection and maintenance programs including a periodic testing regime that will ensure all high voltage equipment remains serviceable and safe and that protection schemes will operate correctly when required. A testing regime may need to include both condition monitoring and functional testing.
- An action plan to address deterioration and aging of equipment or non-compliance with applicable codes such as Australian Standards by instituting a suitable repair and replacement program.
- Procedures to ensure that no extension or alteration of a HV installation is commissioned without Ausgrid's agreement (refer Electricity (Consumer Safety) Regulation 2006). Notification for extensions to the low voltage installation must also comply with this regulation.
- Procedures to ensure prior negotiation with Ausgrid concerning proposed alterations that may affect the interface between the distribution network and a HV installation, or increase and/or change the nature of an installation's load. (see Section 8 of this document)
- It may be relevant to include procedures for safe handling of insulating oils or other substances that will be encountered by staff/contractors in the course of maintaining or repairing electrical equipment (environmental considerations).
- Hazardous areas including confined space risks must be addressed if these exist or may arise on the plant.
- Emergency contacts and procedures such as urgent isolation of electricity supply. The correct contact details of authorised personnel must be shown.
- Procedures for ensuring that parts of a HV installation (eg underground cables) are not damaged by non-electrical staff or contractors (eg by excavators) - Warning signs may be required in some locations.

Appendix B - Schedule of Minimum Operating Procedures and Safety Equipment - HV Installations (Extract from Service and Installation Rules of NSW)

Customers taking supply at high voltage must employ adequately trained staff or contractors. You must establish operating procedures and provide safety equipment to ensure the safe performance of all work on your installation.

All operating procedures must meet the overall conditions of AS 2467 'Maintenance of Electrical Switchgear' namely:

1. The High Voltage Installation (HVI) responsible person must have a documented set of electrical safety rules covering all aspects of operating the high voltage installation. The Safety Rules documented in Appendix A of AS 2467 'Maintenance of Electrical Switchgear' is the minimum requirement.
 2. The HVI responsible person must provide all persons engaged in work on your high voltage electrical substations and/or installation with a copy of the electrical safety rules.
 3. The HVI responsible person must prominently and permanently display the installation's high voltage system operating diagram in each high voltage electrical substation.
 4. The HVI responsible person must provide and cause the operators to be trained in the use of:
 - (a) high voltage earthing equipment designed to facilitate the earthing of all types of high voltage equipment within the installation
 - (b) insulating mats, screens and other similar equipment necessary for the safe operation of the high voltage installation.
 5. The HVI responsible person must provide testing equipment to prove that high voltage mains and apparatus are dead.
 6. The HVI responsible person must provide appropriately coloured tape barriers and stands to display access permits clearly identifying isolated, proven de-energised and earthed sections of the high voltage installation on which work can safely be performed.
- White tape is impractical for snow prone areas.
7. The HVI responsible person must provide labelled storage facilities as close as practicable to the point of use for the equipment described in items 4 to 6 inclusive.
 8. The HVI responsible person must display a safety poster prominently and permanently in each high voltage station within the installation. The poster must outline resuscitation methods and provide instruction in the release of persons from contact with live conductors.
 9. The HVI responsible person must provide "access permit forms" to facilitate the monitoring of all persons accessing isolated sections of your electrical installation, to perform work and to ensure all such persons are clear prior to re-energising of the isolated section of the installation.
 10. The HVI responsible person must ensure that only persons trained in the operation of the installation perform switching within the high voltage installation, and issue access permits authorising persons to work on isolated and earthed sections of the installation.
 11. If the HVI responsible person requires isolation of the electricity distributor's high voltage supply(s), the electricity distributor will ask you to complete an "Operating Agreement". This agreement must be between your authorised operator and the electricity distributor's system controller.

The customer must submit documentation to the electricity distributor outlining the practices, procedures and equipment proposed to be operated, to ensure the high voltage installation is managed in a safe and responsible manner.

For assistance with the written submission and formulation of the required HV switching and safety procedures consult the local electricity distributor's Network Management Plan.