



POWER CONTROL ENGINEERS

## HIGH VOLTAGE MAINTENANCE

**Keeping your operation running.**

HIGH VOLTAGE ELECTRICAL EQUIPMENT, BY THE NATURE OF OPERATION DOES NOT AUTOMATICALLY CALL FOR MAINTENANCE ATTENDANCE. DUE TO THE LACK OF MOVING PARTS AND INFREQUENT OPERATION, INCIPIENT FAULTS AND DETERIORATION ARE SELDOM NOTICED BY SITE PERSONNEL UNTIL THERE IS A FAILURE OR INTERRUPTION TO SUPPLY.

CARRYING OUT ROUTINE INSPECTION, TESTING AND OPERATION OF THE HIGH VOLTAGE ELECTRICAL EQUIPMENT ENSURES THE INSTALLATION'S PROLONGED SAFE AND SATISFACTORY OPERATION.

Persons conducting a business or undertaking, who have a high voltage electrical installation, have legal obligations to safely operate and maintain the installation. Notwithstanding the legislated requirements, an effective high voltage preventative maintenance program will ensure continuity of supply to the site and potentially avoid costly failures.

A responsible high voltage maintenance strategy would typically include the elements described below.

### **1. CONDITION MONITORING**

There are several tools available to perform non-intrusive condition monitoring of high voltage electrical assets. These tools include: thermal scanning, partial discharge monitoring and transformer insulating oil analysis. The results from these various techniques, when tracked over time, can identify issues before failures occur and assist in forward planning for remedial works or replacements.

### **2. INSPECTIONS**

Regular inspections of high voltage equipment and infrastructure is a valuable activity. In many situations, inspections have identified issues, that if left unattended, would ultimately result in the interruption of supply to the site, the risk of electric shock and/or a catastrophic failure.

### **3. TESTING**

The performance and safety of the high voltage installation is reliant on the operation of the various protection schemes. Consequently, the regular testing for correct operation of protection relays, switchgear, transformer protective devices and the earth grid are vital to ensure that, in the event of a fault, the safety of personnel is not compromised and equipment damage is minimised.

### **4. DEFECT MANAGEMENT**

The timely implementation of corrective actions for any faults or non-compliances identified during maintenance cannot be understated. The maintenance system should have provision to capture the details of any remedial works. This information is important in justifying equipment replacement and for failure analysis/investigation.

### **5. STRATEGIC PLANNING**

A strategic plan should be created for the high voltage installation. The plan would be developed from the outcomes and recommendations of the condition monitoring, periodic inspections and testing of the high voltage installation. Typically, such a plan would have a five year look ahead window. It is important to provide forward visibility due to the relatively long lead times to seek capital and procure high voltage equipment.

Whilst there are many common elements, no two high voltage installations are the same. Not only may there be physical differences, but also the criticality of supply to the site, the operating philosophy and the energy requirements are considerations that impact on the maintenance requirements. These factors influence the frequency and extent of the maintenance required. An appropriately tailored high voltage maintenance strategy will provide the most robust outcome for the installation and ultimately reduce the total burden of operating the site.

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