

1. SCOPE

This document details the **Approved** procedure for the use of the VICTOR test instrument on 11/6.6kV circuits via the spouts of metal-enclosed withdrawable switchgear that are not **Live**. This can be done without the Safety Rule requirements of isolation, earthing and a **Safety Document** issued. This procedure details in writing the **Approved** manner for the use of the VICTOR test instrument in order to comply with General Provision, GP3 – Special Instructions, as below.

GP3 – Special Instructions: ‘Work on or testing of **Plant** and **Apparatus** to which these Safety Rules cannot be applied, or for special reasons should not be applied, shall be carried out in an **Approved** manner which shall be confirmed in writing’.

The VICTOR is a combined voltage indicator and insulation tester and aids the identification of earth faults on 11/6.6kV circuits, allowing supplies to customers to be restored without **Live** fault reclosures and elimination of:

- Unnecessary stress to **Apparatus**;
- Voltage dips to surrounding networks; and
- Disturbance to customer’s processes.

2. ISSUE RECORD

This is a Reference document. The current version is held on the EN Document Library.

It is your responsibility to ensure you work to the current version.

Issue Date	Issue No	Author	Amendment Details
Dec 2010	Issue 3	Phil Currie	Update to reflect new MD & minor editorial changes.
May 2019	Issue 4	Paul Williams	Personal Protective Equipment updated to include FR coveralls and visor. Inspection of contacts of fixed & withdrawable portion of circuit breaker. VT guidance added.

3. ISSUE AUTHORITY

Author	Owner	Issue Authority
Paul Williams Operational Safety Engineer	Gary Evans Operational Assurance Manager	Colin Taylor Director Processes & Technology

4. REVIEW

This is a Reference document which has a 5 year retention period after which a reminder will be issued to review and extend retention or archive.

DISTRIBUTION

This document is part of the Management Safety Procedures but does not have a maintained distribution list.

5. CONTENTS

1. SCOPE	1
2. ISSUE RECORD	1
3. ISSUE AUTHORITY	1
4. REVIEW	1
DISTRIBUTION	1
5. CONTENTS	2
6. RELATED DOCUMENTS	2
7. DEFINITIONS	3
8. INTRODUCTION	3
9. DESCRIPTION	3
10. MODES OF OPERATION	3
10.1 Voltage Indicator	3
10.2 Insulation Tester	3
11. SAFETY CONSIDERATIONS	4
12. CONDITIONS OF USE	4
12.1 General Conditions for Use	4
12.2 Approval for Use	4
12.3 Proving Not Live	4
12.4 Authorisation	4
12.5 Accompanied Working	5
12.6 Personal Protective Equipment	5
12.7 Safety Document	5
12.8 Control	5
12.9 Recording of Switching and Test Results	5
12.10 Storage	5
13. USE OF VICTOR	6
13.1 Preliminary Checks	6
13.2 Procedure for Use	6
14. PERMITTED TESTS	6
15. APPENDIX 1	7

6. RELATED DOCUMENTS

ScottishPower	Safety Rules (Electrical and Mechanical) 4th Edition.
OPSAF-12-004	Operation of the HV AC System up to and including 33kV
OPSAF-04-006	HV Fault Reclosing Procedure
SWG-01-001	Switchgear Post-Fault Maintenance Policy
SUB-02-613	Electrical Insulation Testing of HV Equipment up to 33kV
ERDC	Tests on the VICTOR Insulation Tester Voltage Indicator – TT018/6
SMS-04-024	Procedure for Inspection, Testing and Calibration of Test Instruments and Related Equipment
Bicotest	VICTOR T120A Operating Manual

7. DEFINITIONS

Terms printed in bold are as defined in the ScottishPower Safety Rules (Electrical and Mechanical) 4th Edition.

Terms printed in italics are as defined in the Definitions document (OPSAF-11-002) of the Management Safety Procedures.

8. INTRODUCTION

VICTOR is a combined voltage indicator and insulation tester with the name signifying the sequence of operations:

VI - Voltage Indication;
CT - Cable Test;
OR - Outage Restoration.

9. DESCRIPTION

VICTOR is of an all insulated construction and has been designed with a relatively short probe to enable easy access into spouts of metal-enclosed withdrawable switchgear.

10. MODES OF OPERATION

VICTOR has two modes of operation:

10.1 Voltage Indicator

VICTOR operates as a conventional voltage indicator.

It incorporates a rectified moving coil meter, scaled to 15kV, ac & dc, in series with a resistor of over 100-megohms. The voltage reading is not accurate with the calibration a compromise between ac and dc conditions and is not intended to be precise.

Immediately VICTOR is applied to a conductor it will indicate whether there is voltage present.

10.2 Insulation Tester

VICTOR, which has an internal **HV** dc power supply unit, can charge a not **Live** cable relative to earth, to determine whether an earth fault exists.

When energised, up to 13kV dc is applied to the circuit via a 20-megohm resistor with the charging time around one minute, dependent on circuit capacitance.

The test should not be applied if the **System** is known to be **Live**, but is designed to safely withstand this condition should a test be completed in error.

11. SAFETY CONSIDERATIONS

- 11.1 In insulation testing mode VICTOR is capable of delivering a lethal shock:
- Do not store or transport VICTOR with the key in place.
 - Do not touch the probe tip if the key is in place.
 - When preparing for use never point the probe tip towards any other person in the vicinity. Resistors incorporated within the probe of VICTOR are of sufficient value to ensure that it presents no hazard to the **System** or operator if it is applied to a **Live** circuit.

- 11.2 When opening or closing the spout shutters of metal-enclosed withdrawable switchgear by hand, ensure the requirements of Specialised Procedure SP5 are complied with (see Safety Rules).

Additionally, observe the requirements of OPSAF-12-004 (LWM 2.2) part 10.2.9 for visual inspection of spouts and, where practicable, the circuit breaker moving portion before inserting VICTOR into switchgear spouts.

- 11.3 All accessible spout shutters shall be **Locked** shut except when access is immediately required for testing.

12. CONDITIONS OF USE

12.1 General Conditions for Use

The following general conditions shall be met.

VICTOR shall:

- have a current test certificate;
- have a "Do Not Use After Label" and be recorded in the equipment register;
- be used only by an **Authorised Person** trained in its use;
- only be used in indoor or enclosed substations;
- only be used on the spout contacts of metal-enclosed withdrawable switchgear and not be used on exposed connections in any other circumstances;
- be used in accordance with the manufacturer's Operating Manual;
- be held by the handle only, when used;
- not be connected to the test connections of fixed-pattern type switchgear including "Pfisterer" inside cone cable connections.

12.2 Approval for Use

VICTOR is **Approved** for voltage indication, charging cables and short sections of overhead lines to identify faulty circuits on **HV** 11/6.6kV networks, and for indoor use only.

12.3 Proving Not Live

VICTOR shall not be used as a voltage indicator for proving not **Live** as part of isolation or earthing procedures for work or testing.

VICTOR shall be used as a voltage indicator to test that the circuit is not **Live** at **System** voltage prior to the insulation resistance testing.

The circuit to be tested shall be regarded as **Live** at all times during the use of VICTOR.

12.4 Authorisation

Only **Authorised Persons**, OP-1 or OP-2 at 11kV and trained in its use, shall use VICTOR.

12.5 Accompanied Working

Testing of metal-enclosed switchgear spout contacts to prove insulation properties may be carried out unaccompanied, provided the on-site risk assessment carried out by the **Authorised Person** does not indicate that the presence of a second **Person** would substantially contribute to safety.

If other **Persons** are present, the **Authorised Person** shall ensure that they remain clear of the test area when testing is in progress.

12.6 Personal Protective Equipment

When using VICTOR the following minimum PPE shall be worn, besides other normal workwear:

- **Approved** FR coveralls, fastened at the ankles, wrists and neck,
- **Approved** full face visor or helmet with integral visor deployed,
- **Approved** insulated gloves.

These minimum PPE requirements may be increased by the **Authorised Person** as a result of the site specific risk assessment e.g. wearing leather protective outer glove over insulated gloves etc.

12.7 Safety Document

There is no requirement for a **Sanction for Test** or other **Safety Document** to be issued when using VICTOR in accordance with this procedure.

12.8 Control

VICTOR can be used when either Central Control or *Field Control* is in operation. VICTOR shall only be used on the instruction of a **Control Person**.

12.9 Recording of Switching and Test Results

All **Switching** completed while using VICTOR shall be recorded, as per OPSAF-11-010 (MSP 1.8) – Recording and Reporting of **High Voltage** and **Low Voltage Switching**, either under Central Control or *Field Control*, with full use made of control centre **Switching** schedules, the **Switching and Fault Log (SAFL)** or PowerOn mobile to record all **Switching** and test results as appropriate.

12.10 Storage

VICTOR should be stored in a dry place and can be left on permanent charge but only on the Trickle Charge (LO) setting on the charger. The Full Charge (HI) setting should only be used for quick re-charging. A fully charged battery should last for 15 minutes of testing.

VICTOR shall not be stored with the key in place, as this could result in accidental shock.

13. USE OF VICTOR

VICTOR shall be used in accordance with the manufacturer's Operating Manual and as follows:

13.1 Preliminary Checks

VICTOR shall only be used on completion of the following preliminary checks:

- VICTOR must be clean and dry.
- VICTOR shall be used only if the General Conditions for Use, Section 12.1, have been met.
- Where practicable, inspect the circuit breaker moving portion for evidence of distress to the bushings and contacts such as burning, arcing or soot deposits.
- Observing the requirements of Specialised Procedure SP 5, and wearing a minimum of light eye protection, the switchgear spouts shall be visually inspected with the aid of a torch (or equivalent) for evidence of distress such as burning, arcing or soot deposits.

13.2 Procedure for Use

- Complete preliminary checks as above.
- Wear **Approved** PPE (including insulated gloves and visor) until testing is complete.
- Connect VICTOR earth lead to the main substation earth.
- Hold VICTOR only by the operating handle.
- With the probe in a safe position:
 - Insert key into interlock and turn
 - Press green button to illuminate and activate VICTOR and
 - Press the red button and hold to obtain a voltage reading (should be 13kV approximately)
 - On confirmation, release the red button
- Open shutters of spouts to be tested and apply VICTOR to each phase contact in turn without pressing the red button to confirm that the circuit is not **Live** at **System** voltage.

If the circuit is not **Live**:

- The circuit insulation can now be tested, each conductor in turn, by touching the probe tip onto a phase contact.
- Press the green button to activate VICTOR.
- Press the red button and hold to apply test voltage to the circuit.
- Experience has shown that if volts do not peak after 1min, a fault has been established. However, reduced readings are possible on mixed cable and overhead circuits.
- Always release the red button before withdrawing VICTOR from spouts.
- On completion of testing remove key.
- Close shutters and, if appropriate, lock them closed.

Note:

Consideration should be given to the effect of voltage transformers (VTs) when using VICTOR. Some VTs have a star wound primary which will present itself as a 3 phase earth fault. **Switching** may be required before testing with VICTOR to remove these VTs from the circuit being tested.

14. PERMITTED TESTS

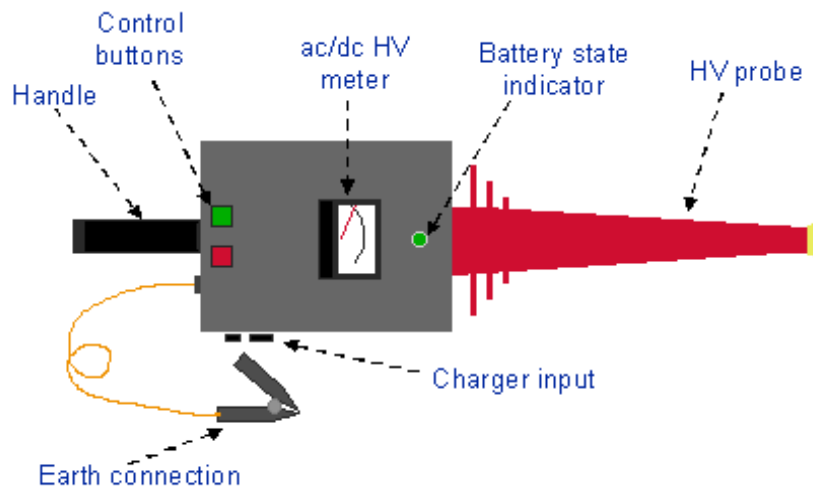
VICTOR shall only be used to test between phase and earth.

Phase-to-phase tests are not permitted and phase-to-phase faults will only be detected if there is a leakage path to earth.

15. APPENDIX 1



VICTOR T120A



30 Power Feb 2000 Issue 1 for C-D and WNW

A United Dominion Industries company