



Update: Use of High Voltage Indicators for Testing or Phasing Checks

This is an update to Express [EXP-10-412](#) which was issued in July 2017 after an incident in which a member of staff received significant injuries whilst carrying out live phasing checks across the busbar and feeder spouts on a Hawker Siddeley Hawkgas Type HG12 11kV switchgear panel using a moving coil voltage indicator. SOP 407 was applied in SPEN as a precaution after the incident.

A Panel of Inquiry was set up to investigate the cause of the incident and to identify any contributory factors which may have had an impact on the cause or severity of the event. A forensic investigation was also conducted on the switchgear and test equipment involved in the incident by independent experts in conjunction with SP Energy Networks, Hawker Siddeley and the manufacturer of the high voltage testing equipment. The SOP has been updated following the findings of the Panel of Inquiry and investigations.

Investigation of the HG12 switchgear confirmed that a flashover and power arc occurred between the fixed contact in the spout and the earthed metal components at the bottom of the spout. Examination of the moving portion of the circuit-breaker revealed evidence that a low-energy flashover had occurred on the circuit-breaker isolating bushings/spouts at some time previously. Inspections of other HG12 fixed portions and moving portions within SPEN has not revealed any signs of similar degradation.

It has been concluded that the cause of the flashover is not attributable to any Type defect of HG12 switchgear involved in the incident.

The independent expert investigation of the HV Voltage Indicator and Phasing Rod also identified no defects and ruled out this equipment as a contributing factor to the incident.

Based on the above findings [SOP 407](#) has now been lifted.



Moving coil type HV Voltage Indicator and Phasing Rod



Hawkgas HG12 11 kV switchgear

Recommendations and action points

The following enhancements have been made to SPEN processes to prevent reoccurrence of similar incidents:

- [OPSAF-12-004 \(LWM 2.2\)](#), which covers operation of the HV AC system up to and including 33kV, has been updated to define the different acceptable techniques for carrying out phasing checks after completion of work on the HV System. Checking across the Live busbar and feeder spouts using an Approved HV Voltage Indicator is only permitted where none of the other described methods in OPSAF-12-004 are reasonably practicable.
- Additionally, [OPSAF-12-005 \(LWM 2.3\)](#) which covers the use of Approved HV Voltage Indicators and phasing-out devices, has also been updated. This procedure now requires that when proving not live or phasing-out on spouts of withdrawable switchgear, Approved bent-end adapters shall be used on vertically withdrawable 11kV switchgear and bent end adapters/extension pieces shall, where reasonably practicable, be used on all other withdrawable switchgear. The HV Voltage Indicator shall be dismantled and the probes, extension pieces and bent-end adapters shall be cleaned using the cleaning kit supplied with the instrument.
- OPSAF-12-005 now also requires that before inserting any test instrument into switchgear spouts, the circuit-breaker moving portion and spouts shall, where practicable, be inspected for evidence of distress to the bushings and contacts such as burning, arcing or soot deposits. The necessary PPE that shall be worn when carrying out these tests is detailed in section 10.2.3 of OPSAF-12-005 and comprises FR coveralls (fastened to the ankles, wrists and neck), Approved rubber gloves and full face visor or helmet with integral visor.