IPART
Independent Pricing and Regulatory Tribunal
New South Wales

Safety Alert 191209-1A (Update)

14 February 2020

Serious burns sustained while operating high voltage switchgear

Two workers sustained serious burn injuries while working on electrical network assets.[1] Information provided by the network operator indicates that a **failure occurred within an oil-filled metal clad switch (the Switch) while operating work was being performed**.

In response to the incident, the network operator put operating restrictions in place (see details below).

Image taken at site by a SafeWork NSW inspector after the accident

[1] The incident occurred on 9 December 2019.

This safety alert has been published by IPART under the provisions of section 63V of the *Electricity Supply Act 1995* (NSW).
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Details of the network operator's operating restrictions

As a precautionary measure while the circumstances of the incident were reviewed, the network operator put the following operating restrictions in place:

- All distribution High Voltage (HV) oil-filled switchgear to be de-energised prior to local operation, with the HV conductors feeding the switchgear remotely isolated.
- Re-energisation shall only be completed via a remote switch, with the substation that the switch is housed in vacated and secured to prevent access during these operating activities.
- The operating restriction applies to all planned and unplanned work tasks.
- There are no additional restrictions regarding general access to substations containing HV oil-filled switchgear and remote operating work may continue as per normal practice.

Sequence of events provided by the network operator

The two workers were performing switching to re-energise the remaining portions of an 11kV distribution feeder following isolation of a reported fault on an overhead section of the feeder (the Feeder). They closed the Switch to energise an underground section of the Feeder from an adjoining distribution feeder. This section of the Feeder contained an unknown cable fault.

Upstream feeder protection operated as designed and the fault was cleared by an upstream circuit breaker. The circuit breaker auto reclosed after 10 seconds, re-energising both the Switch and the section of the Feeder with the cable fault. The upstream feeder protection again operated as designed and the fault was again cleared by the upstream circuit breaker.

Preliminary results of review by the network operator

The Switch was found in the open position with evidence of arcing on the tips of both its moving and stationary contacts. The Switch was assessed and tested and found to be performing as designed.

The preliminary review of the incident indicated that at the time the circuit breaker auto-reclosed (onto the faulted underground section), the Switch was being manually opened by the injured worker and was therefore attempting to interrupt the fault current. We note that the Switch is not designed to be opened to interrupt fault current.[2]

The preliminary review by the network operator indicates that the ABB SD3+SDAF Switch[3] was not the cause of failure and that external factors resulted in the failure.

Where can HV oil-filled switchgear be found?

HV oil-filled switchgear may be found in electricity distribution networks, high voltage customer installations, mines and other facilities (including electricity generation and transmission facilities).

Is action required by network operators?

Network operators may consider it necessary to assess the types of high voltage switchgear in their networks (particularly HV oil-filled switchgear), review the risk controls they have in place, and implement the appropriate level of risk controls to eliminate or reduce risks so far as is reasonably practicable.

Potential risk control options include, but may not be limited to:

- disabling auto-reclosing during fault finding and network restoration switching activities
- remote energised switching of older manually operated switchgear using permanent or temporary actuators
- local de-energised switching of oil-filled metal clad distribution switchgear
- use of suitable arc rated clothing, face shield and PPE when performing local energised switching
- risk-based replacement of older switchgear with modern oil-free switchgear compliant with internal arc containment standards.

SafeWork NSW investigation

SafeWork NSW inspectors responded to the incident. SafeWork NSW commenced an investigation to determine the cause and the circumstances of the incident. IPART is supporting SafeWork NSW in its investigation.

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2 The Switch is designed and rated to close and open normal load current, and to close onto a fault.

3 IPART understands that Andelect and ABB branded SD-series metal clad switches are similar equipment.