



# ELECTRIC ARC IN TOP CABINET



## QSE alert

Associated non-conformity code: NC2016005203

This document contains public information and it is intended to share the lessons learnt from incidents and risk situations that could be of interest to others in the same sector as Acciona Energía.

This document may undergo updates due to the collection and analysis of better information, because of technical advances and the proposed measures etc. For this reason, it is very important to check with Acciona Energía for the latest versions of the issued alerts.

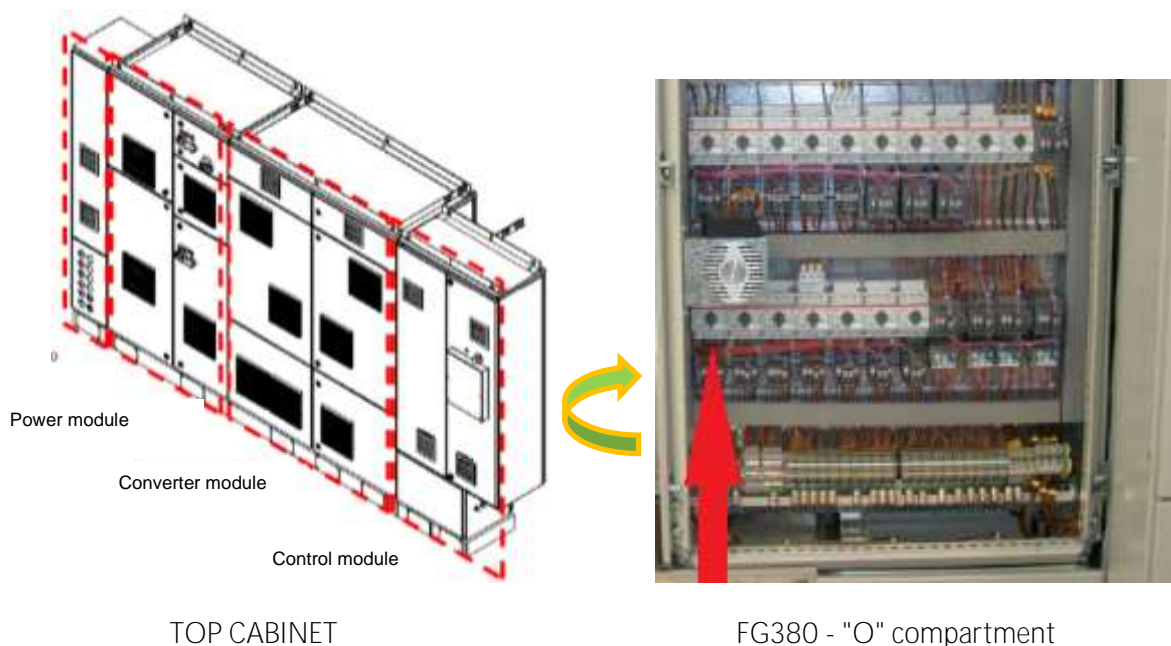
### SCOPE

- Worldwide     Local. Country:
- All Businesses                       Construction                       Production
- All Technologies                       Wind Power                       Hydraulic                       Thermo-electric
- Others. Specify                       Photovoltaic                       High voltage

### FACTS

Wind farm belonging to Acciona Energía, September 2016

A maintenance technician was struck by an electric arc while working on the TOP cabinet of a G8X wind turbine. At the time of the accident, the employee was adjusting the FG380 motor protection breaker in the "O" compartment of the TOP control module, which is located at the rear of the cabinet (see the graphic details).





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### Detailed description of the accident

Two maintenance technicians went to check a turbine with alarm 412 "Fans step-up gear breakers". Once at the wind turbine, one of the engineers went up to the nacelle and checked that the motor protection breaker for gearbox oil cooling (FG380) was open.

The technician checked the breaker setting and reset it in order to check consumption in shutdown and in operation and discard a motor fault. To do this, he used the walkie-talkie to request his companion on the ground to operate the screen in service mode and run the fan test. After this testing, they discarded the idea of a motor fault, so that the turbine problem was declared resolved.

Before leaving the machine, the technician decided to retighten the motor protection breaker but, inexplicably, he did so with power applied and using a mechanic's screwdriver (non-insulated), which caused a short-circuit, together with an electric arc between the motor protection breaker terminal and the metal casing of the fan located just above the FG380,



Close-up of the TOP cabinet and motor protection breaker FG380, where the arc was produced.



Area in which the short-circuit occurred. Simulated situation, WITHOUT POWER APPLIED and employing an insulated screwdriver.

### Consequences of the electric arc

As a consequence of the arc, the affected technician suffered temporary blindness and slight burns to his face, eyelashes, eyebrows and hands.



## LESSONS LEARNT

- Any intervention involving electrical cabinet components, especially with tools, is considered electrical manipulation, and must therefore **be carried out with all power removed from the installation. WORKING WITH POWER APPLIED IS STRICTLY FORBIDDEN!**
- All operations, measurements, testing or checks that can be made with power applied require that prior protection measures be adopted: adequate PPE (**dielectric gloves** suitable for the service voltage, **visor and clothing providing protection against electric arcs**), appropriate tools (insulated or insulator), together with measurement equipment of a suitable class.
- Before working in the "O" compartment of the TOP cabinet, isolation switches FG002 and FG004, which are located in the power section (compartment "D"), must be opened. The UPS installed in the GROUND cabinet means that it is possible for some parts to still have power applied even after opening the power breakers, so that, **before any manipulation, ensure that all power has been removed by checking with a suitable voltage tester.**