



# UNINTERRUPTIBLE POWER SUPPLY SYSTEMS (UPS)



## QSE Alert

Non-Conformity Code associated: NC2016000318

*This document includes information of public knowledge and its goal is to share the lessons learnt that comes from incidents or dangerous conditions and that can be of interest for the people working in the business operated by Acciona Energía.*

*This document could have future updated versions because of a better collection and analysis of the information, the proper improvement of the technology and proposed actions, etc... So that, it is important to consult to Acciona Energía for the up-to-date version of our Alerts.*

### SCOPE

- |  |  |                                       |   |
|--|--|---------------------------------------|---|
| <input checked="" type="checkbox"/> Worldwide        | <input type="checkbox"/> Local. Country: |                                       |   |
| <input checked="" type="checkbox"/> All Business     | <input type="checkbox"/> Construction    | <input type="checkbox"/> Production   |   |
| <input checked="" type="checkbox"/> All Technologies | <input type="checkbox"/> Eolic           | <input type="checkbox"/> Hydraulic    | <input type="checkbox"/> Thermoelectric |
|  | <input type="checkbox"/> Solar           | <input type="checkbox"/> High Voltage |   |
| <input type="checkbox"/> Others. Specify:            |  |                                       |   |

### FACTS

Acciona Energía wind farm, January 2016.

While repairing a fault in a wind turbine and even with the power supplies open and after checking for lack of power, a technician received an electric shock (230 V AC). At the time of the incident, the technician was working in the converter compartment without using personal protection equipment against electrical risks since he assumed that the installation was powered down.



Auxiliary contacts in which the electrical shock occurred.

After the shock (without consequences for the worker), the technicians carrying out the work realised that the power came from the UPS, which had not been disconnected. This shows that:

- All the power sources in the working area had not been identified properly.
- The check for the absence of power was not made correctly.



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### LESSONS LEARNED

- Work with electrical risk must be carried out by authorised/qualified persons only.
- In all work with an electrical risk, it is basic to use **wiring diagrams** and **know how to interpret them**. Cancel the work and request technical support if there is any doubt in interpreting the wiring diagrams.
- Before carrying out any work, identify fully all the power supplies that affect the **working area** (including UPSs) and apply the **five golden rules** (power down, check for absence of power, etc). If the working area must be changed while working, apply the five golden rules again, starting with the complete identification of the power supplies that affect the working area and open or effectively cut them off.
- Respect the uninterruptible power supply systems (UPS):
  - Before working on any electrical installation, check for the existence of a UPS. Remember that the function of a UPS is to maintain power (generally 230 V AC) in certain auxiliary control circuits when the mains fails. These circuits may be powered even when the main circuit breakers in the wind turbine are open.
  - To isolate a circuit powered by the UPS, switch off the UPS and **open its output circuit breakers** (power to loads).
  - Remember that the UPS will stop automatically in a mains failure and will re-start automatically when the mains returns. In each case, check the duration of the batteries.
  - Before working on cabinets with a UPS, also check for absence of this power (generally 230 V AC).

