

## 4 Safety Recommendations

The following Safety Recommendations have been made:

- 4.1 **Safety Recommendation 2009-021:** Boeing Commercial Airplanes should consider implementing differential current fault protection of main power contactors when designing future electrical systems.
- 4.2 **Safety Recommendation 2009-022:** The Federal Aviation Administration, in conjunction with the European Aviation Safety Agency, should consider mandating the replacement of ELM 827-1 contactors with ELM 827-3 contactors on all Boeing 777 aircraft, to reduce the risk of a contactor breakdown that results in uncontained hot debris.
- 4.3 **Safety Recommendation 2009-023:** Tyco Electronics Corporation should introduce mitigating action to reduce the risk of auxiliary contact blade failure in ELM 827 and ELM 828 contactors, in order to prevent a broken blade from causing a short-circuit failure.
- 4.4 **Safety Recommendation 2009-024:** The Federal Aviation Administration, in conjunction with the European Aviation Safety Agency, should mandate that all Boeing 777 aircraft be equipped, at the earliest opportunity, with a software update that will generate a caution message to alert flight crew of the presence of smoke in the Main Equipment Centre.

The aircraft manufacturer responded to this Safety Recommendation by stating:

*‘Boeing is undertaking a review of system architecture, smoke detection, flight deck indications, and flight crew procedures across all of our production models to ensure a consistent approach to fireworthiness and flight crew indication, and identify safety enhancements that may be warranted. This work will include a review of the “SMOKE EQUIP COOLING” message for 777 passenger aircraft.’*

- 4.5 **Safety Recommendation 2009-025:** The Federal Aviation Administration, in conjunction with the European Aviation Safety Agency, should mandate that all Boeing 777 aircraft be equipped, at the earliest opportunity, with a containment tray below the open base of the P100, P200 and P300 power

panels, to prevent any hot debris from a failed contactor from falling on to insulation blankets or other components and causing heat and fire damage.

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