

Electrical distribution: how to ensure safe powering and high availability for LHC machine protection systems?

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The LHC machine protection systems are powered by 64 UPS systems (Uninterruptible Power Supplies) distributed over the whole LHC tunnel. In this presentation, the UPS distribution networks are reviewed highlighting the major improvement made in 2009 in order to provide redundancy in the powering. Though this important change has been considered as successful for the MP systems, the other users including the electrical group who operates these UPS systems have been strongly affected, losing in availability. Indeed, the same UPS distribution networks are also employed for powering other users (e.g. cryogenics and vacuum control systems) where the main constraint is availability in order to reduce LHC downtime. During the first long shutdown LS1, the existing UPS systems will be replaced in order to increase reliability in the electrical distribution. This presentation shows the new UPS configurations which have been studied in order to improve both safe powering and the availability for all users. Other matters like how to test the redundant power of the systems, as well as what to expect from selectivity in the electrical distribution network are also discussed. Finally the topic of the power distribution network quality versus LHC systems sensitivity is tackled.