

Explanation of Terms:

- **Overtages :**

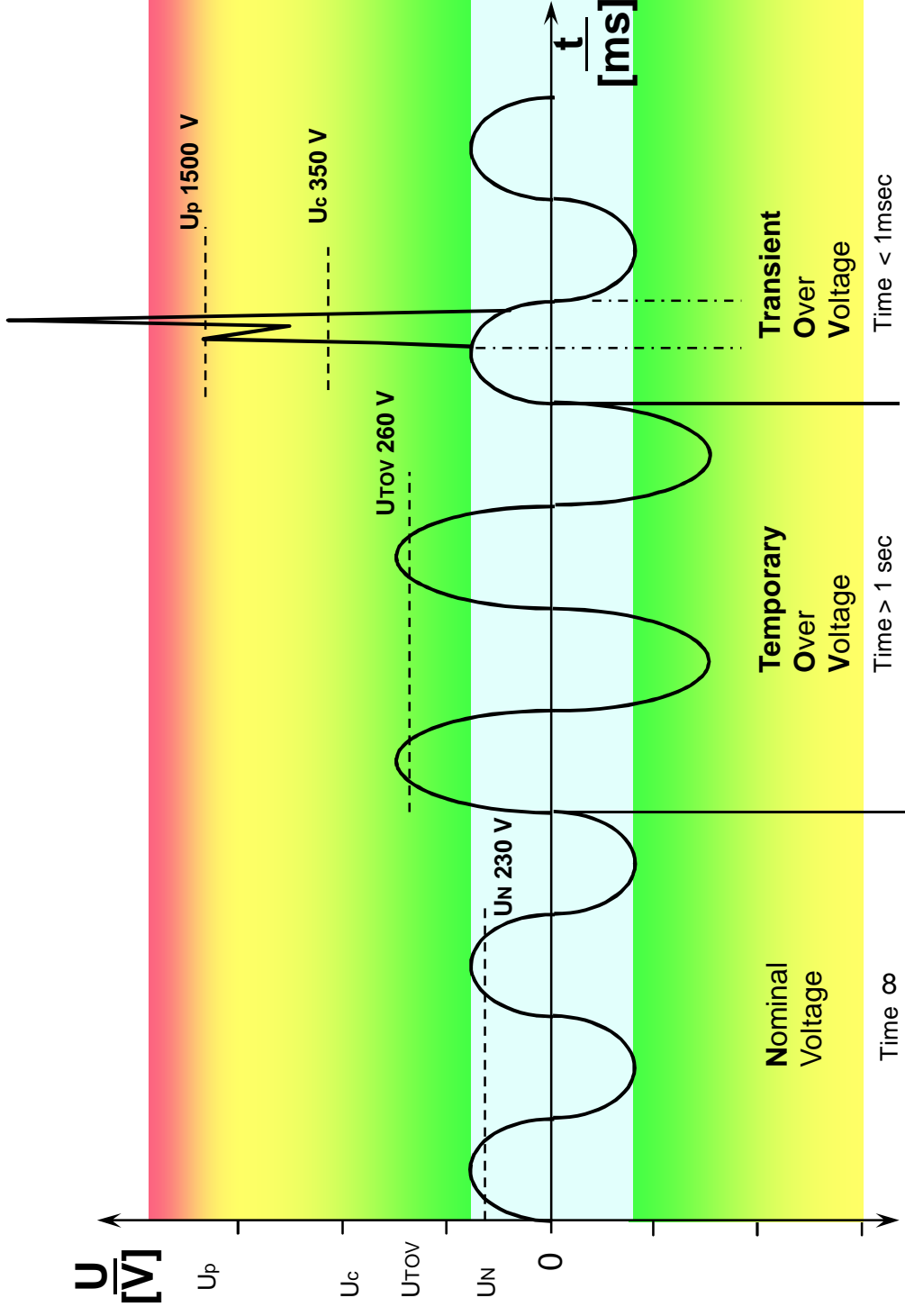
Overtage is the **permanent** or **temporary** voltage between conductors or between conductor and ground in systems which can damage (electrical) equipments

- **Transient:**

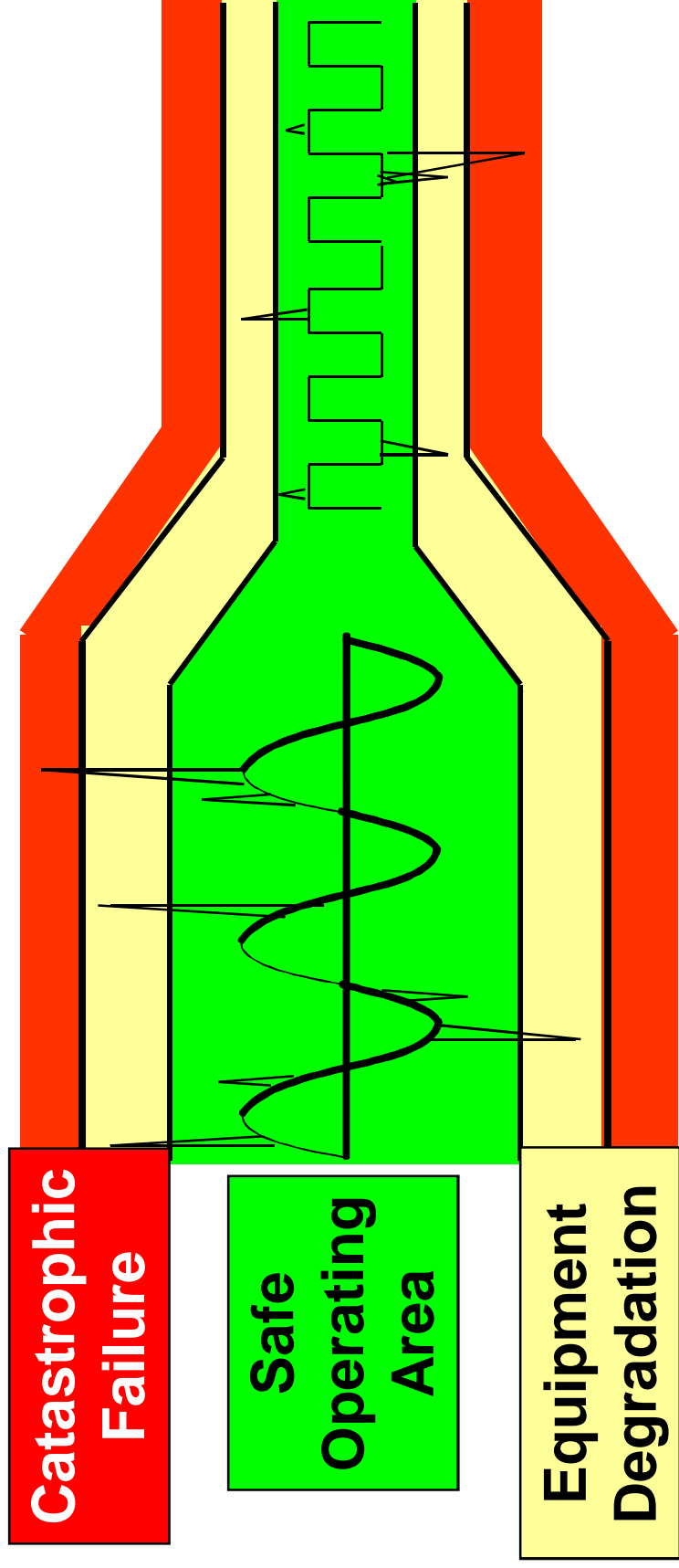
Describes a phenomenon or variable which changes during what is, in comparison to the time scale being observed, a **short period of time** between two consecutive stationary conditions

·µs...

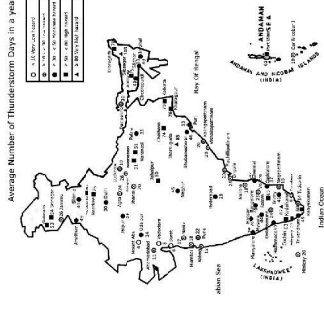
TOV vs Surge



Failure Modes of Equipment



Facts about Lightning:



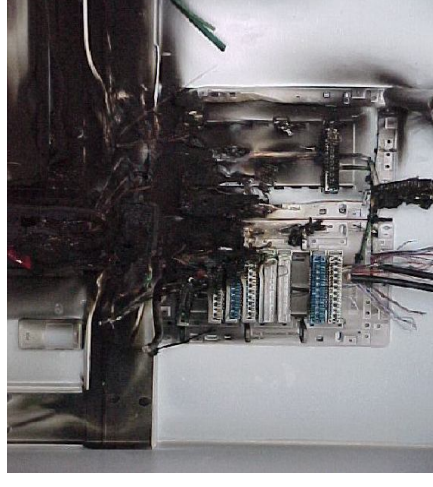
- There are over 1.4 billion lightning flashes worldwide every year, 8,640,000 strikes a day, and 100 strikes per second
- Most lightning strikes average 3200 to 4800 meters long, and carry a current of 10000 Amps at 100 million Volts
- The temperature of a lightning bolt can reach 54,000 i.e. 5 times greater than the temperature of the surface of the sun
- As per National Crime Records Bureau (NCRB), 2113 deaths in India were recorded due to lightning. The figure climbed to 2622 in 2010. On an average 7 people in India die each day due to lightning

Damage due to Lightning:

- Lightning can cause fatal damage to humans, animals and property
- Lightning is a destructive force that can damage buildings, power stations, communication and signal systems, industrial equipments etc



- Despite facing problems related to the damage & failure of field equipments, failure of electrical installations, damage to the electronic equipments and signal lines (for example DCS, VFD, SCADA systems), in India, most of the industries haven't adopted a defensive approach against lightning



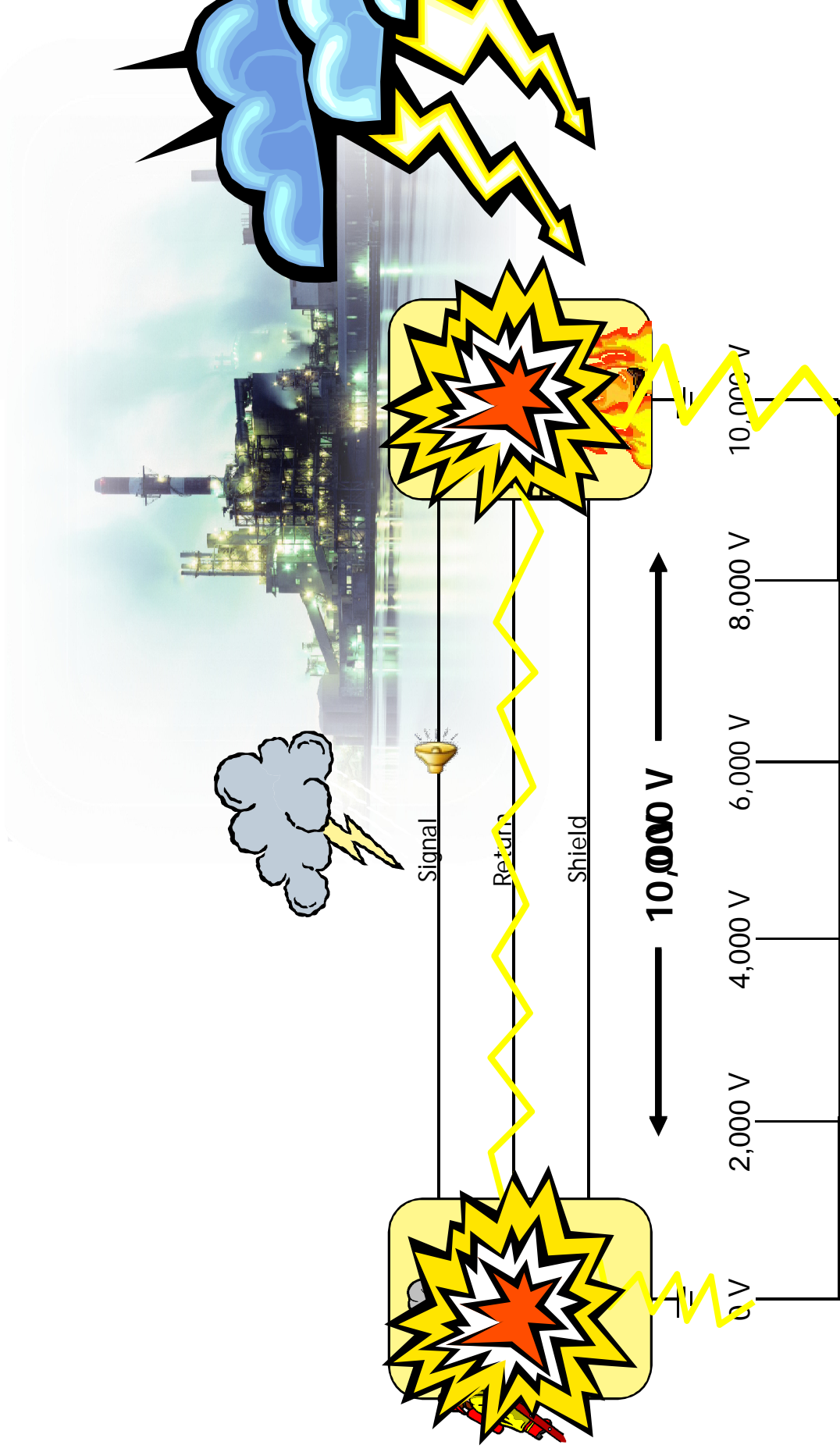
Why Lightning Protection required ?

- Protection against lightning reduces the risk of loss, damage or injury from direct strikes and against lightning induced surges
- Protection to the building is provided by the various methods as per the National Standards (IS 2309) & International Standards (NFPA 780, IEC 62305)
 - The Mesh Method
 - The Rolling Sphere Method
 - The Protective Angle Method
- Reference Standards
 - IS 2309 Indian Standard
 - OISD 180 (Oil Industry Safety Directorate)
 - NFPA 780 (National Fire Protection Association)
 - IEC 62305 (International Electro-technical Commission)
- Protection to the electronic equipments, communication and signal lines is ensured by providing surge protection as per IEC 61643

Salient Features of the Lightning Risk Assessment:

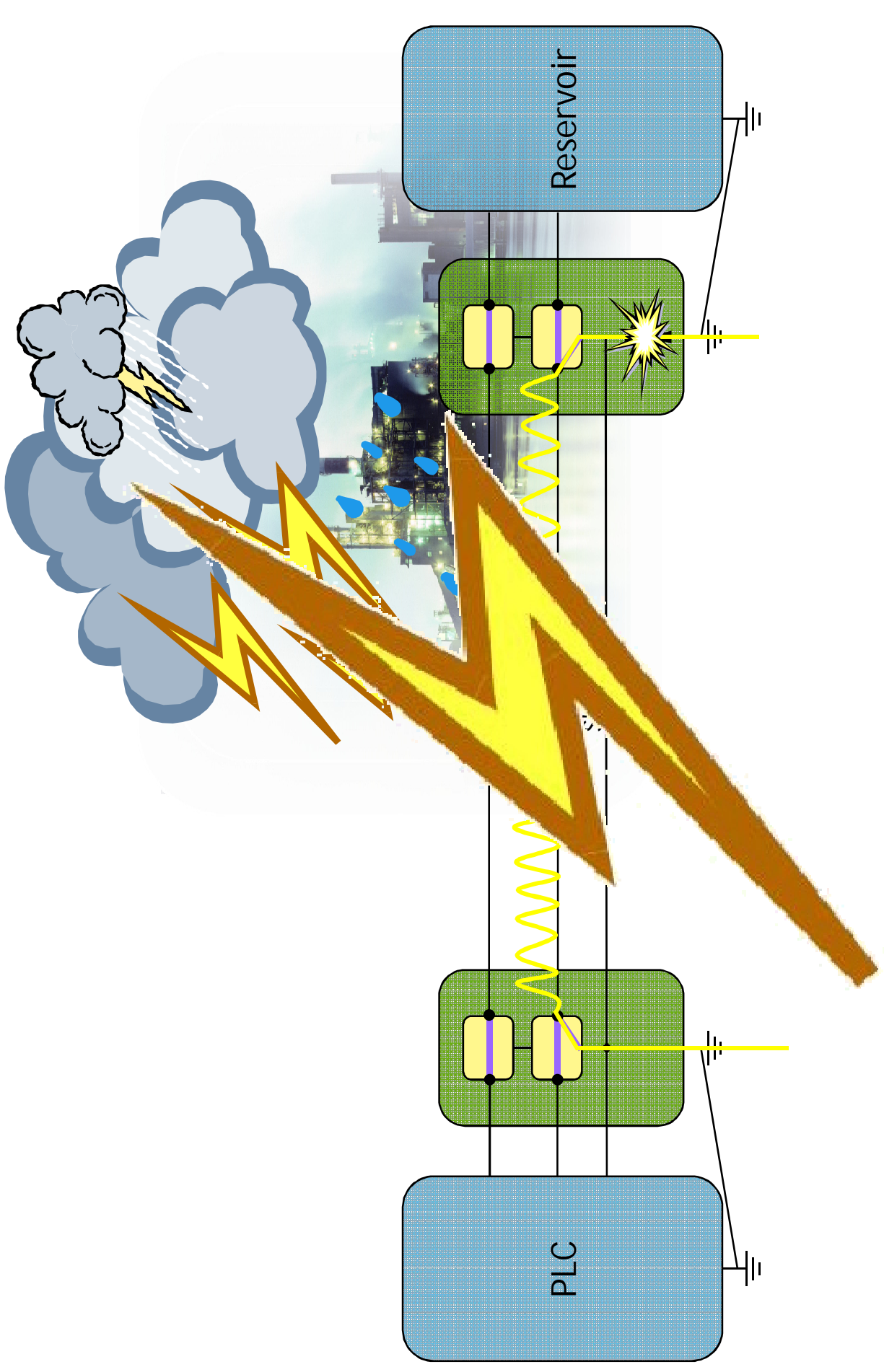
- Review and assessment of the existing lightning protection system as per National Standards (IS 2309) , International Standards (NFPA 780, IEC 62305) and suggesting suitable measures to bridge the gap
- Review and assessment of the surge protection system - protection to critical & sensitive electronic equipments like PLCs, DCS etc.
- **Suggesting suitable measures to provide surge protection system to the unprotected electronic equipments**
- Review of the maintenance aspects and procedures of the existing lightning protection system, and suggesting suitable corrective actions

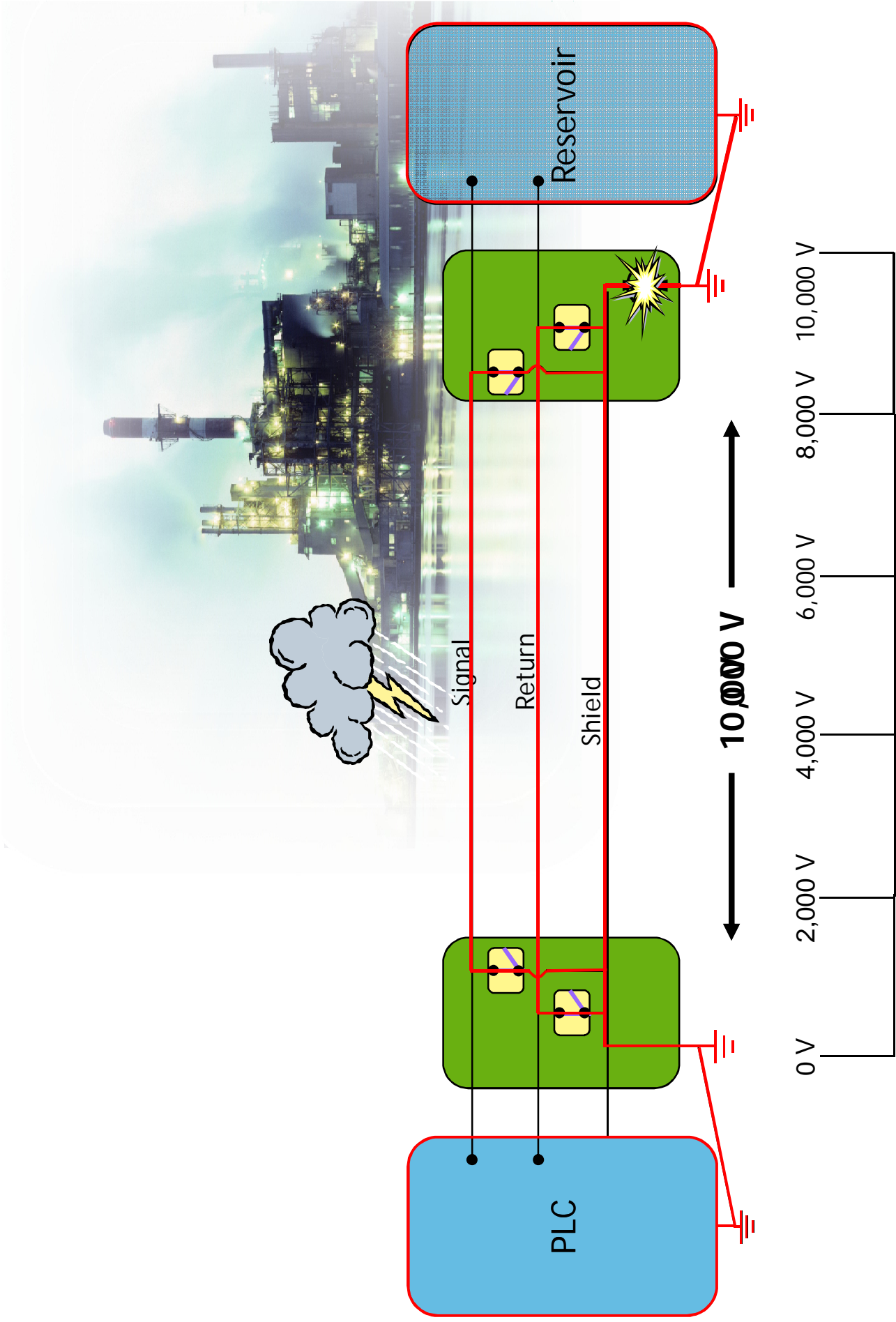
EFFECT OF LIGHTNING



PROCESS BREAKDOWN LOSS OF REVENUE

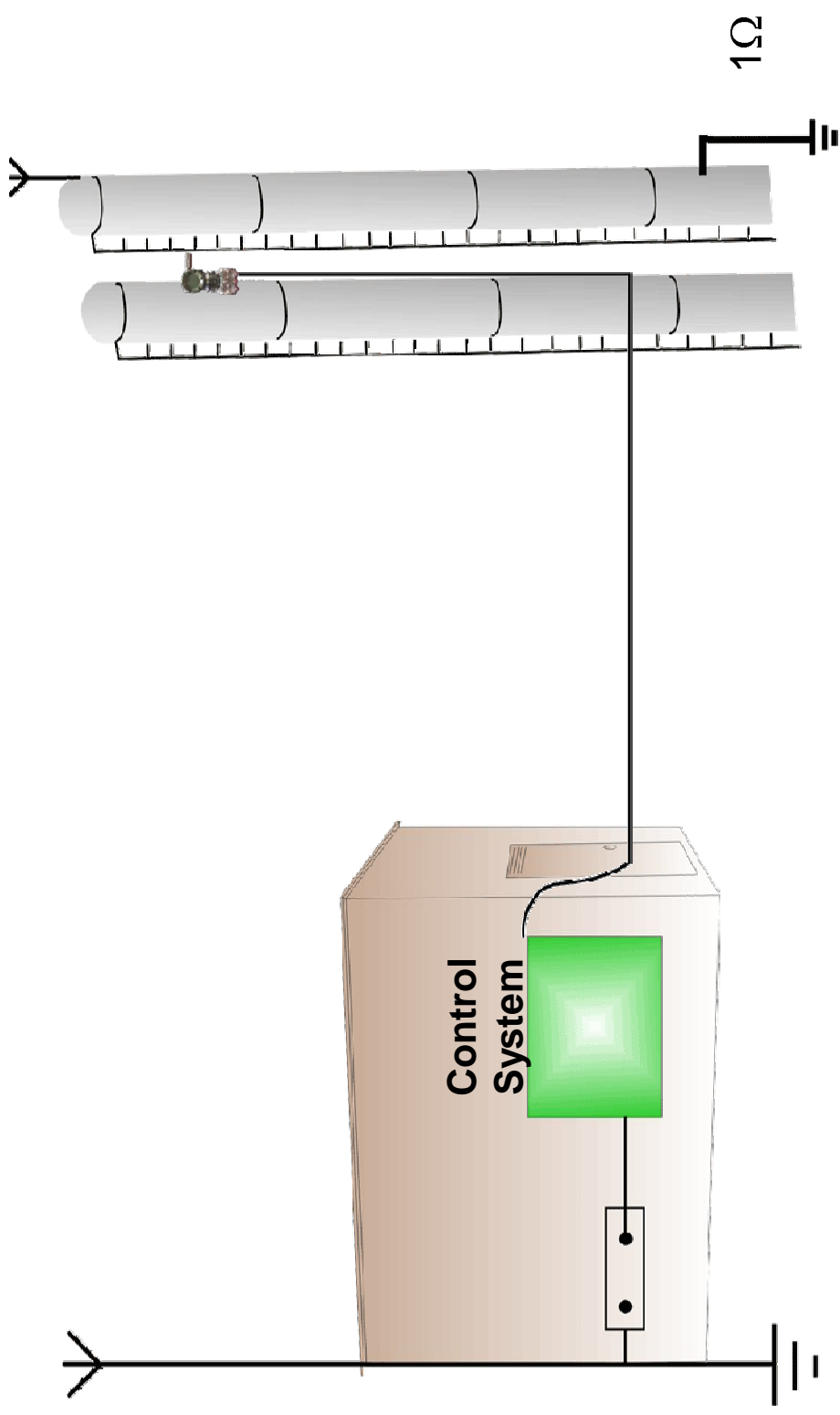






Damage due to Lightning

CONTROL SYSTEM



500M

Lightning Strikes

