POWER NETWORKS

Lightning Protection System Studies

Overview

Lightning strikes can be highly destructive, having the potential to cause loss or disruption of services (such as utilities), irreparable damage to buildings, economic or monetary loss to infrastructure, and even cause injury or loss of life to people or livestock. Our specialists at PSC UK apply over 15 years' worth of industry experience to support our clients in determining the risks associated with lightning to their assets and, where required, provide recommendations and designs for the mitigation of these risks in compliance with industry standards.

PSC UK offers a lightning protection consultancy service that provides expert guidance in analysing the potential risks of lightning-related damage to your assets and installations and in the selection and implementation of effective protective measures. Our consultants are highly experienced, offering unbiased and impartial design solutions ensuring compliance with UK and international standards, which are independent of installation services or material sales.

Our team of specialists can draw upon extensive experience in the field to apply their knowledge and expertise to a range of installations such as generation, transmission, distribution, renewables (battery, solar, wind, EV chargers), industry, and commercial, to ensure compliance with UK and international standards such as IEC (BC) EN 62305, NFPA780 and IEE998.

Key capabilities

- Risk assessment of buildings and infrastructure in accordance with IEC (BS) EN62305-2
- Lightning Protection System (LPS) modelling and analysis (under simulated lightning strikes) using 3D modelling software
- LPS design in accordance with IEC (BS) EN62305-2, NFPA780 and IEEE998
- Preparation of LPS designs using Computer Aided Design (CAD) software
- Electrical system protection guidance
- Post-construction commissioning assessment
- Third-party LPS design audits
- Lightning protection policy support
- Insulation coordination studies including switching and lightning surge analysis

PSC relevant experts

Robert Knott – Principal Engineer

Robert Knott is an IET Chartered Engineer, with over 15 years of international experience in the risk assessment, design and analysis of lightning protection systems across a diverse range of sectors including power generation, transmission, distribution, renewables (battery storage/solar/wind), oil and gas and industrial. As a result, Rob offers his time and support as a Regular Member of the CIGRE Working Group C.4.43 “Lightning problems and lightning risk management for nuclear power plants.” Working alongside other international experts in the field of lightning, we are working towards publishing a guideline for the development of lightning protection designs for nuclear power stations, based on the concept of lightning risk management.

Stephen Lilley – Senior Engineer

Stephen is a senior engineer with over 6 years of experience of lightning protection system assessment and design across the Power (generation, transmission, distribution), renewables, nuclear and industrial sectors. Stephen has a comprehensive knowledge of the application of UK and international standards such as BS EN62305, IEEE998 and NFPA780.

PSC relevant projects

Ravine 330kV Substation

A 330/33 kV Gas Insulated Substation (GIS) with a four-breaker mesh arrangement was being established for connection to a large power generating plant. The substation was designed to connect to an existing 330kV overhead transmission line and to connect two 330/33kV transformers. As part of the work, PSC were requested to conduct an insulation coordination study to confirm that the selected types and locations of the surge arresters are suitable to provide adequate protection level for substation equipment against switching and lightning over-voltages. The study was conducted in an electromagnetic transient simulation software, with models constructed to represent a GIS substation, overhead lines, cables, transformers and surge arresters, considering the frequency dependency of various equipment. The conducted insulation coordination study confirmed that the lightning over-voltages and the switching over-voltages are unlikely to exceed the insulation withstand levels of the equipment at the GIS substation and that the specified surge arresters provide adequate protection against the potential over-voltages.

Lightning and Switching Studies for Overhead Transmission Line in New Zealand

As part of the commissioning of a 220kV underground cable and GIS switchgear in Auckland, New Zealand, PSC studied the effects of lightning and switching surges as well as over-voltages associated with back feed from a weak distribution network. As a result of our studies, the client modified the scheme design and installed a shunt reactor to mitigate over-voltages.

Killala (Lisglannon) 38kV Substation

PSC were appointed to undertake a lightning protection study for the 38kV AIS substation and associated wind turbines, in accordance with IEEE80, IEEE81 and ESBN specifications 18134 and 18133. As part of the study, a buried earth electrode system for each wind turbine was designed to ensure that lightning protection resistance requirements were achieved. CDEGS earth fault simulation studies were carried out to determine the resistance of the proposed earthing system for each wind turbine to ensure compliance was met.

Goole Fields 2 Wind Farm

PSC were subcontracted to carry out an insulation coordination study to demonstrate that the location, type and ratings of proposed surge arresters were adequate to protect the wind farm electrical system from potentially damaging over-voltages. As part of the work, PSC conducted the insulation coordination study utilising EMTP software to investigate potential over-voltages on the wind farm electrical system. These included both lightning and switching over-voltages associated with the connection to the local 66 kV distribution network and also switching over-voltages generated internally within the Goole Fields II 33kV collection network.

New Zealand
Wellington
+64 4 232 7680

Australia
Fortitude Valley, QLD
+61 1300 933 632

North America
Kirkland, WA
+1 425 822 8489

Europe
Newcastle, UK
+44 7967 228 064

Asia
Singapore
+65 (800) 616 3283

CONTACT US